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STUDIES IN THE PSYCHOLOGY OF ALCOHOL.

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I.

THE PSYCHOLOGY OF THE INTOXICATION IMPULSE.

§ 1. INTRODUCTION.

The problem which is outlined in the following chapter, is concerned with the nature and origin of the intoxication impulse, considered in its relations to the mental development of the individual and of the race. The interest in it grew largely out of a desire to know the value of the methods of psychology, as applied to the problems of ethics, for it seems likely that the next important step in ethics will be an appeal to psychology for an explanation of the motives which underlie conduct. Both subjective and objective methods are available in such studies. We can appeal to the introspection of the individual, and we can also infer the nature of mental action as expressed in conduct.

In regard to our present problem, the psychologist's work is (1) to gather facts about the intoxication impulse, as it is

felt, and as it expresses itself in the form of motor activity; (2) to study these facts in their relations to other known facts of normal and abnormal psychology. Apparently one of the most serious faults of method of the sciences which deal with abnormal man, is their tendency to study abnormalities without sufficient regard to the normal conditions from which they are deviations. Take for a single example the criminological method of the Lombroso school. To illustrate the dangers of it, it is sufficient to point to Nordau, whose conclusion that all society is pathological, is the logical result of the indiscriminate search for abnormalities.

It is the business of normal psychology, using both objective and subjective methods to present such a conception of mind as will prevent the dangerous and narrow minded tendency of regarding *all* departures from the so-called type as abnormalities. It must explain the origin of pathological mental variations, and study them as they occur in slight variations from the normal in borderland cases.

§ 2. INTOXICATION AMONG PRIMITIVE AND CIVILIZED PEOPLES AND AMONG ANIMALS.

In looking for the origin of an impulse so deep-seated and so wide-spread as that toward the use of intoxicants, it is natural to turn to the drinking habits of primitive peoples. To present an adequate account of the use of stimulants and narcotics among them would require a volume. No attempt is made here even to classify or name the various alcoholic drinks which have been used, the purpose being solely to extract the main psychological principles. Alcohol drinking is certainly poly-genetic. It has not spread as a custom from one part of the world to another, but is indigenous to many lands, and at various times. Primitive society presents one advantage over civilized society for the study of drinking customs, in that it is far less complex. Yet it can hardly be said that intoxicants have played a less important part among uncivilized than among civilized peoples. Indeed, it is hard to imagine what the religious or social consciousness of primitive man would have been without them. They have created gods; and about their use have crystallized myth and superstition, rite and ceremony in endless variety. State ceremonials, worship, marriage, the funeral, secular festivals, initiatory rites, dances, games, hospitality, care of the sick, preparation for war, consummation of peace, transaction of business, all have served as occasions for intoxication.

Religion. Excitement has often been regarded as an essential part of religion, and it has been induced in various ways as a means of divine worship; for example by violent movement, fasting, self torture and drugs. Epilepsy, chorea, hysteria, have

all been regarded as divine, and have been voluntarily induced. Long courses of training in practices which make the nerves crepitate have been believed to bring the soul into touch with supernatural things. So it is but a special instance of a general belief when intoxication is regarded as god-given or pleasing to the gods. For primitive man this belief was natural, for not only did the ecstatic feeling and sense of increased power suggest this view, but in the dreams which drugs produced, he seemed to enter his heaven and talk with his gods. It is a long way from the primitive soma worship in which all the devotees of Indra became intoxicated to please the god to the decent communion service of our own day; but none of the transitional steps are lacking, and probably this sacrament has a deep ancestral root in some of these early rites.

Suggestions of the use of intoxicating drugs by primitive man, for some purpose, possibly religious, are not wanting. Dawkins¹ speaking of the neolithic civilization in Europe, says that the poppy was cultivated, and that small round cakes have been found which may have been intended for use as a narcotic.

The earliest historical example of a religious cult founded upon intoxication was the soma worship of the Hindus. This has so often been described that a brief mention of it is all that is necessary. The god, Indra, was supposed to be present in the wine, as at a later time, was believed by the Greeks in regard to Dionysus. Both the Zend Avesta and the Vedas speak of a sacred plant, the fermented juice of which was employed in sacred rites. The Hindus believed that the performance of the soma ceremony was highly beneficial for both body and soul. They believed that Indra himself drank soma to obtain strength and victory in battle. They also attributed length of days to its use.

Religious intoxication cults are scattered all over the world among uncivilized people, and there can be little doubt of their independent origin at many times and in many places. A remarkable religious intoxication ceremony² has been described recently, which has spread from the Kiawi Indians and associated tribes which formerly ranged from the Arkansas River southward into Mexico, until it has become the chief religion of all the tribes of the southern plains. The ceremony usual takes place Saturday night and lasts until noon the next day. The men sit around the brightly burning camp fire, chewing the intoxicating mescal while a continuous singing and beating upon drums is kept up, interrupted by occasional prayers for the sick and by baptismal rites.

¹ Early Man in Britain, and His Place in the Tertiary Period, p. 293.

² Mescal Buttons. Prentiss and Morgan. Medical Record, 1896, I, 258-266.

The Pueblos, another race of American Indians, are described as a sober people who never become intoxicated except as a part of their religious ceremony. Featherman¹ describes a sacred festival of the Yakuts which is nothing more than an elaborate drinking ceremonial. Spencer says that the Dahomans deem it a duty to the gods to be drunk. The Ainos of Japan drink to the gods, as is also the custom of the Polynesians. In Fiji, drinking is accompanied by prayers or chants to the gods. The Patagonians pray to be eternally drunk in Heaven. Among the American Indians intoxication by tobacco was put to religious uses.²

Shamanism. A somewhat different religious use of intoxicating drugs is connected with shamanism, a cult practiced among a great many tribes in different parts of the world. The shaman uses various means for producing a condition of excitement in which he sees visions, prophesies, or drives out evil spirits and diseases. Epileptic or hysterical excitement is induced by wild and rapid movements, contortions, beating of drums, confusion, fasting, and drugs. In some cases long training is undergone to produce a nervous condition; young candidates are chosen from among the constitutionally neurotic. This widespread custom among primitive peoples suggests similar cults in the middle ages and in modern times in which various forms of nervous disorders, such as hysteria, epilepsy, chorea, convulsions, and ecstasies were voluntarily induced for religious purposes.

Among many other tribes intoxicants are used to produce this divine state. Among some tribes³ in the Phillipines the shaman is usually a woman who works herself up to a state of frenzied nervous excitement by means of contortions and copious draughts of fermented liquor. Feasting and revelling follow, until oftentimes at her medicine ceremonies all present become intoxicated and fall into an unconscious state.

The Indians of California, Mexico, Peru and Brazil, all had drug ceremonies which vary in the drug used and in minor matters of form; but in their nature they are essentially alike. Dyer⁴ says that the Darien Indians of South America give seeds of datura to children to produce a prophetic delirium in which they reveal hidden treasures. Information about their enemies was obtained in a similar way among other tribes.

Domestic life. There is no important event in the life of the savage which has not been especially celebrated by intoxica-

¹ Featherman: Social History of the Races of Mankind, Vol. IV, p. 249.

² See Spencer: Ethics, Vol. I, p. 441.

³ Featherman: Social History of the Races of Mankind, Vol. II, p. 499.

⁴ The Folk-Lore of Plants, p. 103.

tion. Any occasion which excites the emotions, whether it be joy or sorrow, seems to have demanded artificial means of intensifying the feeling. Birth appears to have been celebrated less than other important events of life, and there is comparatively little intoxication ceremony connected with it. Some New Mexican Indian tribes have a peculiar birth ceremony, celebrated only at the birth of a first child. In this the father becomes intoxicated, and in that state is surrounded by a dancing multitude who score his body until the blood flows freely.

The use of intoxicants in pubertal rites is very common, especially among the American Indians. The Tuscaroras¹ of North Carolina, among other initiatory ordeals for boys, administered to them several kinds of barks and stimulating plants which produced a state of intoxication. When the Creek² boys were to be initiated into manhood they gathered two handfuls of a certain plant "which intoxicates and maddens," and continued eating the bitter root for a whole day, and then steeped the leaves in water and drank from this decoction.

Marriage, aside from being among savage people an occasion of general festivity in which intoxication adds to the excitement, is also marked by special ceremonies in which fermented drinks play an important part.

Death is also celebrated by intoxication. Featherman says of the Lapps³ that when a man is dying the friends gather around the bed in order to assist the passage of the soul into the next world. They drink brandy in order to produce an artificial excitement which causes them to weep. Funerals, as well as weddings, often close in general intoxication. Among the Urabas, of Nicaragua,⁴ when a chief dies ceremonies are held around the grave for two days, carried on amid the excitement produced by intoxication. Among other tribes the dead are remembered by annual drinking festivals.

Social. To give a complete account of the relations of intoxicants to the social life of primitive man would be almost to give a complete account of the social life itself.

The American Indians furnish an example of the close connection of stimulants and narcotics with the very roots of the social consciousness. Although alcoholic drinks were used in many places on the North American continent, the great narcotic was tobacco, which, however, was used not for its soothing effect alone, but very frequently to cause violent intoxication. Its influence in the life and society of these peoples was very great. Abbott⁵ says: "To know the history of tobacco, of the customs of smoking and the origin of the pipe would be

¹ Featherman: *op. cit.*, Vol. III, p. 128. ⁴ Featherman: *op. cit.*, Vol.

² Featherman: *op. cit.*, Vol. III, p. 161. IV, p. 459.

³ Featherman: *op. cit.*, Vol. IV, p. 459. ⁵ Primitive Industry, p. 315.

to solve many of the most interesting problems of American ethnology."

Among some peoples drink ceremonies have taken on the importance of a state function. A very interesting example is that of the Seminoles¹ who prepared no intoxicating drink, but who indulged every morning in a tea known as the "black drink," a slightly exhilarating beverage, prepared in the public square for the whole community by a cook expressly charged with the duty. The taking of the black drink was considered a solemn act having both a religious and a military significance. Extraordinary powers were attributed to it. It was supposed to have a purifying effect upon their lives, and to efface from their minds all the wrongs they had unintentionally committed. It had the power of imparting courage to the warrior and of rendering him invincible; of binding ties of friendship and of exciting kindly feelings. They regarded it as a blessing upon them as a chosen people. A similar ceremony was performed by the inhabitants of the Tongas.² When they arose at break-of-day the higher classes met for a drinking bout, kava being served. The taking of kava was always attended with tedious ceremonial forms and the strictest observance of etiquette. The whole community generally assembled. The common people were considered merely as spectators. A kava party was regarded as an essential part of any state affair.

Among the Creeks the taking of war physic was of the nature of a state ceremonial.³

We can sum up the social aspects of drinking among primitive peoples by saying that every event in the community out of the daily routine, which brings the people together, is likely to be the occasion of intoxication.

Periodic drinking. One cannot help noticing on examining the anthropological literature that the drinking of primitive peoples has a tendency to be periodic. The statement is frequently met with that tribes who are usually sober and industrious, on occasions indulge to great excess. The examples, of which the following are typical, are very numerous.

"The amusements of the Guatamalans⁴ are less common and varied than among the whites, and are generally reserved for special occasions when all indulge to excess. Reunions with dancing are the common form of these amusements. Drinking is inseparable from them, and they do not usually break up until all have attained the climax of their wishes, becoming helplessly drunk."

¹ Featherman: *op. cit.*, Vol. III, p. 170.

² Featherman: *op. cit.*, Vol. II, p. 115.

³ Featherman, *op. cit.*, Vol. III, p. 164.

⁴ Featherman: *op. cit.*, Vol. III, p. 550.

"The Maricopas tribes of the Pueblos¹ indulge once a year in a drinking bout, which continues from one to two weeks.

"The Dyaks of Borneo² celebrate numerous festivals of a quasi-religious character. The head feast lasts four days and four nights and a general state of intoxication closes the solemn ceremony.

"The Pueblos³ get drunk once a year, the revelry continuing for a week or two at a time. But, it is also a universal custom among them to take regular turns, so that only one third of the party is supposed to indulge at once. The remainder are required to care for their stimulated comrades and prevent them from injuring each other or being injured by other tribes. Some of the Pueblos' dances end with bacchanalia in which not only general intoxication but promiscuous intercourse between the sexes is permitted.

"Once a year the Keres⁴ have a grand drink feast and dance. They pass the night in indulgences of a most gross and sensual description."

"The Mosquitos⁵ have drinking bouts which last for days. At this large numbers assist in draining the canoe full of liquor prepared for the occasion. Occasionally, surrounding villages are invited and a drinking bout is held, first in one house then in another, until the climax is reached in a debauch by both sexes of the most revolting character."

"The Gonds⁶ of the central provinces of Hindostan are of an unsteady temperament. They are industrious and work laboriously for a time, but during certain intervals of repose they abandon themselves to unrestrained dissipation, and squander the scanty gains they have earned. They believe that they have divine permission to sing, laugh and drink according to their hearts' content."

The statement that has often been made that no tribe has existed without its stimulant or narcotic, probably cannot be substantiated. It is true, however, that there is no large area of the earth's surface without its intoxicant. E. H. Man⁷ says that in the Bay of Bengal, prior to the advent of the whites, the natives were ignorant of narcotics in any form. The Fuegians are said to have no intoxicating drinks of any kind, confining themselves exclusively to water. Several nations of American Indians, among them the Hurons, Chinooks, California Indians,

¹ Featherman : *op. cit.*, Vol. II, p. 279.

² Featherman : *op. cit.*, Vol. II, p. 350.

³ Bancroft : *Native Races*, Vol. I, p. 550.

⁴ Bancroft : *op. cit.*, Vol. I, p. 551.

⁵ Bancroft : *op. cit.*, Vol. I, p. 706.

⁶ Featherman : *op. cit.*, Vol. IV, p. 115.

⁷ Andaman Islanders, p. 44.

the Shoshones, the Natchez and the Seminoles are all credited by either Bancroft or Featherman with an ignorance of alcohol in any form. Some tribes of Indians on the river Ariare, in New Granada, South America, are said not only to have no intoxicant of their own, but to refuse the stimulants of the whites.

Temperance. Primitive man was not wholly devoid of ideas of temperance. Certainly among the historical relics of the early civilizations frequent reference is made to the evils of drinking to excess. Laws were enacted and punishment inflicted for excess in drinking among many peoples. The worshippers of soma thought that all other liquors caused evil effects, and therefore prohibited them. Drinking is prohibited to women and lower classes among many peoples. One form of intoxicant is sometimes allowed to one class, while other classes use a different drink. Spencer thinks that temperance arose as self-control in order to offer libations to the gods. Though the idea of temperance may have originated partly in this practice, there is no reason to believe that this was the most important cause. Other factors enter, such as observation of its evil effects. The difference in the drinking of man and woman doubtless had an origin largely in the differences of mental activity in the two sexes. Later, no doubt, an increasing consciousness of, and respect for, the self was a cause of restraint (probably a very strong psychological motive for temperance at the present time). An increasing interest in general self-control as an ideal is probably the most potent factor of all in the development of temperance.¹

Conclusions. Among primitive peoples, the use of intoxicants, although not quite universal, is so general, that exceptions are noteworthy. Intoxication seems to have originated in connection with the religious and social consciousness. Probably the use of fermented drinks originated in this way, and the use of them as beverages came at a later stage. A rather careful examination of the anthropological literature leads to the conclusion that taste was not much concerned at first. On the whole, primitive man is not a steady nor habitual drinker. He drinks alcohol occasionally to secure intoxication, his drinking is likely to be periodic, and in general it is characterized by great excess and uncontrolled excitement.

Intoxication in early civilizations. The history of intoxication among the civilized nations has for the most part been sufficiently treated by others. The best account is to be found in Samuelson's "History of Drink," and reference is made to that work.

¹See § 8.

Samuelson says that in every nation there was a period just previous to the time of highest culture when intoxication was exceedingly prevalent, and that again in the degenerate days after the highest point of culture was past there was a second period very similar to the first. In China there was an early period of gross intemperance. Mensius, a disciple of Confucius (about 500 B. C.), mentions drunkenness and speaks of the excessive use of wine in the sacrifices. But this appears not to have been a very frequent sin in his day. Long before that, however, the Shooking or history and the Sheeking or book of ancient poetry speak of an edict against drunkenness said to have been promulgated about 1100 B. C. It seems that drunkenness had taken such a hold upon the people as to threaten the ruin of the nation. In India, also, there was a period of great prevalence of intoxication, for the soma and sura play a very important part in the history of the early period. It is evident, also, that at one time drunkenness was not looked upon with disfavor for Indra was believed not to be capable of any great deed unless he was intoxicated.

Among the western nations Greece affords, in the worship of Dionysus, the best example of a religious cult growing out of the intoxication impulse. In its earliest form the Dionysiac worship appears to have been merely dancing and singing around the altar of the god, accompanied by intoxication; but with all the revelry there was an air of solemnity and reverence. It was later that there came to be in connection with this worship nude and sometimes indecent processions. In these the spirit was one of abandonment; slaves were given brief liberty and general drunkenness prevailed; Bacchus was represented, accompanied by women frenzied with drink or excitement carrying cymbals, dancing, and singing songs in honor of the god. In one of the celebrations performers, women and girls called Mænades, took part; orgies were held at night in the mountains; there were blazing torches and the wildest excitement prevailed.

The cult and symbolism of Dionysus have been variously interpreted. Nietzsche¹ says that the Greek conception of Dionysus was as the key to the mystery of life. The fundamental Greek instinct was revealed there. The meaning was the triumphant affirmation of life over death and change. Nietzsche finds also a very close relationship between sex and intoxication. Taylor's explanation of the Bacchic and Eleusinian mysteries is based upon its symbolism.² "They were considered for

¹This and the following abstracts from Nietzsche are from Ellis: *Affirmations*.

²Taylor: *Eleusinian and Bacchic Mysteries*.

two thousand years or more," he says, "the appointed means of regeneration through an interior union with the divine essence. They were symbolic of the death of the old life and the birth of the new. The lesser mysteries occultly signified the miseries of the soul while in subjection to the body, the greater obscurely intimated by mystic and splendid visions the felicity of the soul here and hereafter when elevated to the realities of intellectual vision." The symbolism here signifies a higher consciousness and a more abundant life.

Whether a merely noetic explanation is sufficient to account for the form of these rites, they certainly originated in the emotions, and it is equally certain that pessimism and a craving for relief of pain were not the motives. Nietzsche touches the right key when he says that the Dionysia expressed a fundamental instinct of the Greek life. Music, the dance, intoxication, revelry, all united here under the guise of religious fervor to express the natural exuberance of life which was characteristic of this civilization.

Their poetry expresses this deep feeling element in no uncertain tones. Farnell¹ says that the dithyramb began here in the wild ecstatic song sung by wine-flushed revellers. Mure² expresses the same view when he says that everything leads to the belief that the proper characteristic of the Bacchic dithyramb, especially as remodeled by Arion, was like that of the god and his worshippers an exuberance of jovial excitement. Nietzsche discovers here, also, the origin of Greek art in two impulses, one starting in the phenomenon of dreaming, which he associates with Apollo, and the other starting in the phenomenon of intoxication associated with Dionysus. Tragedy is the outcome of Dionysiac music fertilized by Apolloniatic imagery. Perhaps at no time in history has the inner growth force been so well exemplified and so fervently worshipped as in the early period of Greek civilization. The spirit of intoxication, as it was expressed in the Dionysiac cult, was one form in which the growth-impulse found vent in consciousness. The feeling which is expressed is a craving 'for life and for life more abundant.'

Intoxication among animals. Animal psychology has little to offer in the way of facts which bear upon the subject of the intoxication impulse, and the few facts which are well authenticated are difficult of interpretation, especially those in regard to the habitual use of alcoholic drinks by animals. Apparently animals are affected by alcohol in much the same way as men

¹ Farnell: Greek Lyric Poetry, p. 102.

² Mure: Critical History of the Language and Literature of Ancient Greece, Vol. III, p. 88.

are. Romanes¹ made experiments upon jellyfish, starfish and sea-urchins. The first effect upon *Sarsia* is to cause a great increase in the rapidity of swimming movements, so much so that the bell has no time to expand properly between the occurrences of the successive systoles. These motions gradually die out, and finally the animal is no longer responsive to stimuli applied to the tentacles. As to how the animal feels, whether he enjoys this experience and desires to repeat it, probably no one would venture to say. Dogs under the influence of large doses of alcohol show signs of apparent exaltation, in which motor activity and expressions of social feeling are increased, followed by stages in which there is depression and fear, and the animal skulks away and hides. Wasps have been observed in a state of intoxication after attacking over-ripe fruits. They get very drunk, crawl away in a semi-somnolent condition and repose in the grass until they recover, and then go to the fruit again. When thus affected they are said to do their worst stinging. Stories are told of elephants, apes, and dogs which have acquired a taste for alcoholic liquors. The fox terrier, a favorite among sailors, is often credited with a craving for alcohol. But in general such stories lack corroboration and there is always uncertainty as to the psychological interpretation of the facts. There is no doubt that dogs can be trained to drink beverages which contain alcohol, perhaps to like them; but it is impossible to determine in any case whether taste is all that is involved, or whether the animal is capable of forming such a complex association as to like a drink which is disagreeable in taste for the sake of a remote psychic effect, which is certainly the case with the human subject. Darwin² relates cases of baboons being made drunk with beer. The next morning the keeper found them holding their heads tightly, but when offered beer they refused to taste it again. One is tempted to say at first thought that the baboons remembered their disagreeable experiences, and objected to repeating them. But a more probable explanation is that they had a sensation of nausea, at the sight or smell of alcohol. Perhaps they would have refused food also. Dogs will readily drink sour beer and become intoxicated. Hens and chickens will devour eagerly bread soaked in whiskey or brandy. There are stories about dogs which prefer beer to meat. In the first two cases we cannot assume anything except taste, in the case of the dogs we cannot assume that, for there is another factor—training. Dr. Hodge's dogs have never shown a taste for alcohol during more than a two years' course of experiments, in which it was given

¹Romanes: *Jellyfish, Starfish and Sea-urchin*, p. 227.

²Darwin: *The Descent of Man*, p. 7.

to them daily in rather large doses. One of these dogs after scenting a bottle of alcohol retired to a corner and refused to come when called again. This was after the two years' course of experiments. In her case, however, the dose had never been sufficient to cause intoxication.

So far as these facts go there is no evidence that animals learn to appreciate the state of intoxication or acquire a craving for alcohol. Although the matter is open to definite experiment, facts, even if obtained experimentally, would be difficult to interpret.

§ 3. THE STATE OF INTOXICATION.

Comparative effects of intoxicants. The drugs which are commonly used for intoxication purposes, though differing greatly in chemical composition, can be grouped into a single class, when they are studied with reference to their physiological effect. They are all stimulant-narcotics (Anstie), that is to say, when taken in small doses, or as an initial effect of large doses, they stimulate the nerve cells. Large doses invariably produce narcosis. It is true of most, if not all of these drugs, that, whether applied to a single nerve fibre, or to the nervous system as a whole by way of the circulation, they produce first a stage of increased excitability followed by a stage of lessened excitability. The mental effects are analogous—a stage of exhilaration is followed by a stage of depression.

A still wider generalization may be made. All poisonous substances which finally destroy the nervous tissue cause an initial stage of increased excitability. But, inasmuch as we have at the outset restricted the discussion in this paper to the psychological aspects of the subject, it is unnecessary to more than refer to the physiological problems involved. There has been much discussion as to the nature of the physiological and chemical processes of stimulation¹ and excitation, but little is surely known. The synonymous use of the two words has added much to the confusion. It is probable that there is a wide difference between increase of normal function, and increased excitability or irritation which may be regarded as an expression of the active resistance of the nerve cell to a poison,

¹ Stimulation, according to Anstie, is an increase in the *normal* functions of the nerve cell. Narcosis is paralysis of these functions. Most of the phenomena of excitement which occur in intoxication he says, are due to narcosis and not to stimulation. Many writers at the present time would deny that alcohol ever exerts a stimulating effect, in the sense of the word as used by Anstie, but class all its effects under the general head of narcosis or paralysis.

For a full account up to its date, see Anstie: "Stimulants and Narcotics;" also the works on *materia medica* and therapeutics, *e. g.*, Wood, Brunton; also standard works on poisons.

or even as a stage of paralysis. The physiological changes in the different stages of intoxication are quite unknown. Some think that paralysis of controlling brain cells can account for the increased mental activity; others think that the effect is upon the cells directly involved in the activity.

There are many interesting but for the most part popular accounts of the mental effects of the stimulant-narcotics. De-Quincey's "Confessions of an English Opium Eater" set the style for much of the literary treatment of the subject, and also popularized the use of drugs among writers for the purpose of exciting the imagination. Although in all these accounts some allowance must be made for exaggeration, their points of general agreement must be given due credit. There have also been made a considerable number of experimental studies upon intoxication which are of interest to psychology. Weir-Mitchell, Prentiss and Morgan, Delabarre, and others, have recently done experimental work with drugs.

It is the common testimony that in drug intoxication, the normal limits of both pleasure and pain are passed. Delabarre¹ says, that, as an effect of hasheesh one gets a larger idea of the range of the emotional life. The various forms of intoxication are nearly, if not quite always a succession of emotional changes, in which exhilaration accompanied by a free flow of thoughts, is followed by depression and decreased associational power. Frequently mentioned effects of drugs are the awakening of early memories, exaggeration of emotional states, changes in time and space perceptions commonly referred to as a "feeling of infinity," fantastic color visions, confusion of hearing and vision, animistic beliefs, philosophic insight, double personality, sensations of extension of the body, increase of personality.²

Experiments with intoxicating doses of alcohol. Experiments which were made by the present writer upon four subjects with intoxicating doses of alcohol, show that until the intoxication is well advanced the rapidity of simple mental processes was not greatly decreased. Adding, the memory of nine place figures, rapidity of tapping, strength of hand clasp, estimation of distance and of time, clearness of vision, were not seriously interfered with until muscular inco-ordination became extreme. The rapidity of tapping was most affected. Ability to control a reflex wink was greatly increased by the alcohol. A study was made also of the effect of intoxicating doses of alcohol upon the association of ideas. A list of 400 words was given to the subjects once on a normal day and then again two weeks later,

¹Paper read before the American Psychological Association, New York, 1898.

²These statements are summarized from 60 cases gathered from the literature.

during the stages of a progressive intoxication. A single reaction to each word was required and the time was not taken. Comparing the two series of normal and alcohol reactions it appears that in the case of each subject there was a progressive dissimilarity in the two series which reached a maximum and then decreased as the effects of the alcohol passed off. The most noticeable change in association was the increase in the egoistic associations due to the alcohol. In one case the visual associations were increased. The chief effect upon consciousness was a succession of changes in the emotional tone. In all cases a stage of exhilaration was followed by a stage of depression and melancholy which in turn gave way to the normal condition. In two cases a second stage of exaltation followed the melancholy stage, but this was not so clearly marked as the first period. The emotional changes seemed to dominate the changes in the character of the associations. In each case there was a very clearly marked moment in which there was a feeling that control was being lost, accompanied by a desire to throw off all restraint and give way to the feelings.

In regard to the theory that the nerve cells are affected by alcohol inversely to the order of the acquirement of their function, our data rather confirm than contradict the statement, so far as it relates to motor development. Ribot¹ states this view somewhat as follows: 'At first there is an excitement, the very antithesis of reflection. Attention as a result of a motor convergence can no longer exist. Next the control of the tongue is lost. A man tells all his secrets; the will under the higher inhibitory form has disappeared. After this he becomes incapable of any continuous plan of action. Then the will, even under its lowest or most impulsive form, becomes powerless. Then the most delicate voluntary movements, those of speech and of the hands, cease to be co-ordinated. One degree lower he loses the semi-automatic movements, those of walking; then muscular tonicity weakens, he falls from his seat; then reflex movements are abolished, finally there is a cessation of automatic movements, those of respiration and of the heart.'

Conclusion. Examination of the literature of intoxication, and the experiments show that the pleasure of the state is due in part to the wide range of emotional tone. The changes in association appear to be dominated by changes in the emotions, the physical bases of which changes are quite unknown. For the present purposes, however, it is unnecessary to know their nature. The experiment upon the reflex wink, and common observation, both show that the feeling of personal safety is increased in the pleasure stage of intoxication. The falling

¹ Psychology of the Emotions, p. 424.

away of the sense of propriety which occurs in intoxication is illustrated by one of the cases studied. During the first two rounds of tests the subject (who is naturally very careful) was very exact in observing all the conditions of the experiment. In the later tests he showed an increasing carelessness and confidence. The psychological changes show an increased activity in those sensations, emotions, and associations which make up the self. The increased social feeling evidently depends upon these changes and is secondary. This is borne out by popular testimony as, for example, that those exhilarated by alcohol are better talkers than listeners. The two important conditions of social comfort are self-confidence, and (perhaps as a result of this) freedom from suspicions in regard to others. These factors differ greatly among individuals, and in the same individual they are subject to fluctuations due to physiological and other conditions. Just how alcohol produces these psychical conditions, whether by removal of certain recently acquired associations, or entirely by more general changes in the emotional tone, it is quite impossible to determine. The intimate relation of intoxication to the social impulse undoubtedly accounts in part, at least, for the widespread and persistent use of intoxicants, especially among primitive peoples. Doubtless it made possible wider social relations than could otherwise have been maintained in many cases where suspiciousness due to manner of life or to temperament tended to prevent free social life.

§ 4. A STUDY OF CASES OF INEBRIETY.

People who use alcoholic drinks to excess may be divided into two classes, dipsomaniacs and drunkards. The former are periodic drinkers, and true dipsomania is now generally recognized to be an indication of some form of nervous disease. The drunkard is the steady drinker, who, in general, drinks whenever he has opportunity, but drunkenness may take the form of sprees without becoming a true dipsomania. A study of various classifications of drinkers discloses the fact that there are two general types of organization which predispose to drunkenness. One is the undeveloped type, intellectually, morally, and physically of a low order. It represents a low stage of culture in which habit and ideals do not clash. The second is the degenerated type. People of this type commonly possess the craving for intensity of consciousness, which goes with culture and high ideals, but lack balance. To this class belong many men of genius who seem to crave strong excitement. But, applied to individual cases, such generalizations are unsatisfactory, and there is no more perplexing problem in individual psychology and physiology than is presented by the subtle dif-

ferences of organization, which make it possible for one man to drink moderately, without danger, while another, apparently as well constituted and as favorably conditioned, perishes in the presence of alcohol.

Dipsomania is full of interest to psychology. On the mental side it is a recurrent impulse to become intoxicated. During the intervals there is no desire for alcohol, and usually aversion. Its rhythms are especially interesting. Howard says that he believes the long rhythms in nutrition and heat regulations of the body are factors in augmenting and aggravating the periodicity of dipsomania. Monthly rhythms of the female are often accompanied by attacks of dipsomania. The season of the year seems also to exert a minor influence in inebriety. Crothers says that inebriety is more marked and more impulsive in the spring and early summer months. In a thousand cases of inebriety ninety-four drank to excess in April, May and June, and at no other time of the year.¹ In women the commencement of dipsomania very often dates from menstrual disturbances, from pregnancy, and from the menopause. The attacks of dipsomania are usually preceded by disturbed mental action and control. Before an attack the dipsomaniac is irritable, and there are other signs of nervous disturbance. When alcohol cannot be obtained there is restlessness, indefinable horror as of some impending danger, the throat is parched, the skin hot and dry, the pulse rate is increased.

These are the main facts of dipsomania. For more extended accounts reference must be made to the psychiatric treatises, such as the works of Krafft-Ebing, Kräpelin and others. Also to numerous articles in the *Journal of Inebriety*.

Below are given extracts from sixty-five cases of inebriety, studied by the present writer largely to determine the nature of the craving for intoxicants as it is felt by the inebriate. Most of the men studied were confined in criminal institutions. A few were voluntary patients in inebriate asylums. For the most part the conversational language of the subject is retained.

Case 1. Man, 25. Drank since 15. Used a quart of whiskey a day for years. Has drunk alone, but generally likes to drink in a crowd. No craving for it at all while in jail.

Case 2. Man, 31. Drank his first glass at 24. Drinks socially altogether. Is drunk every Saturday night. No craving for drink now or during the week when he is out. When tired and thirsty one glass of beer tastes good. After that it is not the taste. He drinks for the feeling, or because he has lost control, and does not care what he does. Afterwards feels the disgrace keenly. He is strong, of athletic build, and in perfect health so far as he knows.

Case 3. Man, 36. Always drinks in company. Never intends to get

¹ Crothers: The Influence of the Seasons on Inebriety, *Quarterly Journal of Inebriety*, July, 1897, Vol. XIX, pp. 315-316.

drunk when he starts. Occasionally between drunks will take a glass of beer. Trouble will always make him get drunk. When in jail feels the loss of his pipe, but does not feel the loss of his drink. As a boy, was very bashful. Would always take a few drinks before going to a party or social.

Case 4. Man, 38. Been drinking since 16. Very seldom drinks alone. Has no appetite for it here, and does n't see why it can't be the same outside. If he succeeds in going two or three weeks without drinking, he does not crave for it.

Case 5. Man, 52. Been drinking since 16. For the last few years has drunk very heavily. Drinks mostly in company. Drinks because he worries. Has n't missed liquor at all since he came here. Misses his tobacco some. Is of a nervous temperament, always was nervous. Thinks he is not going to drink any more.

Case 6. Man, 21. Been drinking since 14. Has drunk alone a good deal. Likes to be alone when drinking. Has drunk as many as thirty glasses a day. Had been drinking heavily when arrested, but missed the liquor for two or three days only. Takes more to make him drunk than when he began drinking.

Case 7. Man, 43. Been drinking since 20. If he takes one drink is sure to take another. Doesn't like the taste of beer nor liquor. It is for the feeling after it is down. If there was no rum, would never have any longing for it.

Case 8. Man, 32. Very hard drinker. Does n't care for the taste of liquor at all. Does n't care anything about it until he gets into company. Never goes into a saloon alone. If worried about anything goes out looking for company, and drinks. In jail, does n't crave either liquor or smoking. But does crave chewing tobacco.

Case 9. Man, 43. Of melancholy temperament. His drinking is periodic. Always drinks alone. When he drinks with a crowd, he spends too much money. Will go for two or three months and have no desire for it at all. Went a year without touching it. Is quite sure he is never going to drink any more.

Case 10. Man, 50. Been drinking since 16. Has never had any craving for drink. Never thinks of it when in jail. Does not like the taste of whiskey or beer, or any other kind of liquor. Never goes in to drink alone, even when he has money. He never goes in because he wants a drink.

Case 11. Man, 48. Been drinking since 19. Doesn't like liquor. Never goes in to get a drink by himself. Drinks by speers. When he meets two or three old friends, he likes to go in and talk over old times, and thus gets drinking and can't stop. Misses the tobacco more than rum. A man does n't need rum, he does need tobacco. Is sure he is not going to drink any more.

Case 12. Man, 43. Been drinking since 25. Does n't like the taste of liquor. No craving for it, now or ever. But cannot take a glass or two and then stop. Always gets drunk when he drinks at all. His health is good and he is not nervous.

Case 13. Man, 40. Drinking since 17. At 30, commenced to use whiskey altogether. Always drank alone and every day. His usual allowance was fifteen or twenty glasses in a day. Four years ago he stopped for a year after taking a six weeks' treatment. Has no craving for alcohol now whatever, but there is a struggle all the time against depression and fatigue. If he hasn't had anything to drink for a month or two, he does not crave it at all.

Case 14. Man, 18. Never likes the taste of liquor, except after he has been drinking heavily. For three or four weeks after coming to jail he craved both liquor and tobacco. Now he does not think of either.

Case 15. Man, 36. A sailor. Drinks nothing when at sea. Misses

it the first two or three days out. Since he has been in jail has missed his pipe, but does n't care for drink. He never drinks alone. Does n't like the taste of liquor, it is the sensation.

Case 16. Man, 35. First drink at 14. The only craving is on a hot day when thirsty, then he really feels a craving for a glass of beer. It is impossible for him to drink moderately now. When he drinks he always drinks too much. When he has n't had a drink, he doesn't want it. When he has, he wants more. Is in perfect health, so far as he knows.

Case 17. Man, 24. Does n't like the taste of whiskey nor crave it, but when he once takes a taste of it, can't stop short of extreme intoxication. Is never tempted to drink except when out with the boys.

Case 18. Man, 26. Has been drinking since 20. After he has had one drink, he has a strong craving for more. Otherwise he has no taste for it whatever, and never thinks of it except when he is where there is excitement and drinking is going on. To have a good time is the starting.

Case 32. Man, 23. Has no craving for liquor. Once in a while drinks alone, but never intentionally to get drunk. Likes the taste of whiskey. When with a crowd, does not feel as if he was having a good time unless he drinks. If he takes one drink, he always gets drunk.

In fifty-eight of the sixty-five cases studied, there is no evidence of a conscious craving for alcohol, although most of the men who were questioned are confirmed drunkards. Nearly all are recidivists. One has been sentenced sixteen times for drunkenness. The statement that after liquor has been for any reason cut off for a period of from ten to twenty days the craving ceases is so frequent in these cases that it must be regarded as expressing the true mental attitude toward drink of a class of people who are commonly considered incurable drunkards. In the six cases which follow there was some evidence of a craving for alcohol.

Case 19. Man, 49. Unmarried. No nervous disease or insanity in the family, so far as he knows. His father died at 76, of old age; mother at 50, of pneumonia. He has six brothers and sisters, none of whom drink. He, himself, has always been healthy. Left school at 14, was a good boy, always went to church at that time. His first drink was taken at 16. Used to set up ten-pins in a bowling alley. Drank beer there, drank beer altogether for a long time, before he began to use stronger drinks. Never drank for the taste. In general, his drinking has been to create a false spirit when he is down-hearted. He has never been in the habit of drinking daily; for years, his drinking has been by sprees. Between drunks he would not drink at all; has tried very hard to overcome the habit. Thought it was wrong and that it was hurting him. Would fight it for five or six days, but sooner or later would get in with the boys. Of late years he has drunk alone mostly. Went without drink altogether for two years, from 1876-78. At that time was working for good pay and simply made up his mind to stop drinking and succeeded.

Every month for the last seven years, he has spent two days drinking, and three days recovering from it. In this he has been perfectly regular. He has taken asylum treatment to no avail. Although, during all these four years, he has never once missed a week's drunk, he thinks that if there had been no way of obtaining liquor, he never

would have craved it. He has no craving for it now at all, and does n't even think of it. But when he was working, every Saturday he would think of it all the afternoon, would go home in the evening, change his clothes and go down town. He would walk around until about eight o'clock, and then would go in and get a glass of beer; that would be the beginning of drinking, which would be kept up steadily until Tuesday. He knows of no cause for his drinking, cannot in any way explain the impulse, which is entirely beyond his control. Never left the shop Saturday without fully intending to stay sober. Each time determines never to touch another drop. He feels that there is some peculiar weakness of his nature, and thinks that even in the absence of liquor, he would have found some other way to ruin himself. Again he says that he feels quite convinced that he is never going to drink any more. As a child, he was restless and uneasy, of vivid imagination, quick tempered, but honest and truthful. Never cared much for society of the other sex.

Case 20. Man, 38. Only child. Father living, now 80. A periodical drinker. At 11 was made drunk, was taken home by two men. Does n't remember feeling sorry about it. As a child was very nervous and high strung. He has been a periodic drinker since he was 17. At 32 he broke his leg, and at that time began to use morphine to kill the pain. Has used it ever since. Morphine makes him feel dull; it is quite different with alcohol. A little makes him thrill all over. The least taste of alcohol will set him going, even sweet cider, unless it is just out of the press. Morphine he uses now after he has been drinking heavily. It sobers him, makes him fall asleep, and puts an end to his spree. His periods are usually precipitated by meeting a friend. Meeting an old comrade affects him in a manner which he cannot explain. He is inclined to be very intense, both in his likes and dislikes. He hates the taste of drink of all kinds. His periods come now at intervals of from three months to a year. He went once two years without drinking. Many times he can control the impulse, but is very easily and strangely influenced. He feels that he will control his appetite altogether sometime, but expects another attack when he gets out this time. He thinks he is safest when he is where liquor can readily be obtained; when away where he can't get it, there is likely to be an increasing craving. Periods are most likely to come on at times when he is despondent or depressed. He is by nature of an unstable disposition, loves frequent change, has worked at almost every trade. As a boy he had plenty of money, a good education, and never expected to have to earn his living. He feels keenly the disgrace of his condition.

Case 21. Man, 34. An actor. Good health, no nervous disorders. His first drink was at 12. Was out skating on a cold night and drank cherry brandy. His next drink was taken at 17. He was working in a bank, came down town too late for breakfast, ordered a glass of beer. He was alone. After this he drank more or less, socially. He was occasionally drunk, but only at times of unusual festivity, as at New Year's Day and the like. Was married at 21. From 21-27, drank rather steadily, but only in a social way. At 27 he parted with his wife. After that he drank to excess in order to forget. Drank alone altogether, and continually. Rented a room and began a spree which lasted for six months. During that time there was not a day that he was sober. Since then his drinking has been somewhat periodical. Went West to work on a ranch, and went eight months without liquor. He was where he could not get it conveniently and had no craving for it. Was offered drink a few times during that period, but refused. Lately, his sprees have been more frequent. Sometimes he can go for weeks and drink more or less moderately, but invariably ends in an

uncontrollable spree. In 1893 he spent four weeks at the Keeley Cure, from that time to February 1896, he went without drink. His sprees always last as long as he has money or can get whiskey. As regards the craving, when he has n't been drinking, he does n't crave liquor, but when he has once started, the need is imperative. He has no craving since he came to the inebriates' home, although he has not been under restraint. Thinks that if he lived all the time in such an environment, he never would think of liquor. The craving is more of a mental than a physical craving. It is a desire to get away from himself. The craving for drink is a craving which any other pleasure equal in degree would satisfy. It is a disgust with present conditions and a desire to cut loose from old ruts and have a change. Of late his sprees have always been preceded by a fit of despondency. Looking back, he can trace two quite different conditions, which are likely to initiate a period of drinking: one is depression, and the other is unusual success. The nature of his mental condition during a spree differs greatly according to the mood in which it starts. If he starts in a happy mood, he is jovial all the time; if he starts drinking when he is depressed, he is unsocial and silent, and there is no stage of exhilaration. He does not feel at all sure that he is cured. One might as well ask him whether he ever intended to have pneumonia again. It is a thing which he does not control.

Case 22. Man, 45. Father died at 65 of kidney trouble. Mother living at 70. One brother and one sister, both died young. Was 17 when he took his first drink: it was at a wedding. After that drank steadily, and his drinking was periodical from the start, his sprees occurring at intervals of from three to six months. The longest interval was a year and a half, when he was 38. At that time he was a member of a reform club. During all that time he never had any craving for liquor whatever. Excitement and association broke the spell. His periods are induced usually by associating with people who drink, or by misfortune, or anger. He does not like the taste of alcohol nor crave it. But if he gets to drinking cannot stop. He has been arrested eight or ten times, each time for drinking. When drunk he is peaceable and jolly. He never drinks alone. Probably never drank 25 drinks alone in his life. He never cares for drink unless there is excitement, and there is no excitement when a man is alone. Says he cannot remember a day in jail when he ever wanted a drink. He craves tobacco, however, and gets so nervous craving for it that he could almost chew iron. He does n't feel sure that his drinking is permanently stopped. He thinks confinement has no effect, for a man can't be cured by loneliness, the only way is to keep him away from drinking society.

Case 23. Man, 38. Born in Ireland. For the last 28 years he has been drunk about once a week. When he is out of jail has a craving for drink, it is like a gnawing in the stomach, as though he wanted something to eat. Is thinking of it all the time until he gets a drink. Never thinks of it at all when he is in jail. Tobacco he craves. Would think of the whiskey, too, probably, if there was any chance of getting it. It is the thought of it which puts the appetite down into the stomach. Has taken the pledge a good many times, and kept it once a year and a half, fifteen years ago.

Case 24. Man, 40. Is nervous, weak and emaciated. Suffers from insomnia. Says that he does n't know of any worse drunkard than he is. Left school at 15, first drink at 18, was out with a crowd of boys and took two glasses of beer. Has never been able from the very start to drink moderately. Still he thinks he has no craving for it when he has not been drinking. Never cares for it when alone except after drinking, then he would walk five miles to get it. Managed to stop for a few months once, but got out with the boys again; thought that

he could drink moderately, but was soon as bad as ever. His sprees usually last until he gets out of money, sometimes he drinks almost continuously for two weeks. Never thinks of the liquor when he is in jail, craves more for the tobacco. Thinks he has been getting worse lately; the excitement and exhilaration after drinking is less, he seems soon to lose his mind and can remember but little afterwards. He has frequently signed pledges, and once or twice has gone three or four months without drinking. Means to do right, has sworn time and time again never to drink any more. The craving for liquor, as he feels it, is hard to describe. He recognizes it as a kind of hankering and worrying, it is entirely different from the craving a man has after he has been drinking. Since he has been in jail he has felt worried and depressed, but feels nothing which he can call a desire for liquor. Once when he had not been drinking for two months he came to the city on a holiday, and going by a saloon it seemed that he must go in and get a drink. The thought almost made him dizzy, felt as though he could not take any interest in anything, as though all the fun and excitement would be monotonous unless he had a drink to help him enjoy it; but he resisted the temptation, went into a restaurant and had dinner, and all the rest of the day he had no thought of drink. Sometimes when he has a craving for drink other things will satisfy him, as non-alcoholic beverages or a dinner, as in the case described above. The presence or odor of alcohol will not always arouse a craving. He has often been where there was plenty of it, and would have no desire for it, and could not be induced to touch it.

Case 25. Woman, 52. Periodical drinker for the last 17 years. The periods have usually come at intervals of from four to six weeks. She has been six months without drinking. Thinks she has been worse since she was 44. For the last four years and a half she has n't drunk at all, having been in voluntary confinement in an inebriates' home. She is not in any way under restraint. She goes out to church and on errands, and during the day works, serving the establishment in the capacity of cook. In appearance she is strong, well nourished, apparently of strong will, very intelligent. Has a deep religious sense, is extremely sensitive about her degradation and her menial position. Is at times unsocial, irritable and sarcastic. She still has the craving for alcohol, which is likely to come about once in a month. At those times she goes to the matron and asks to be watched. She thinks that she will have to fight this craving all her life. Her only physical ailments, so far as she knows, is slight dyspepsia and nervousness. If things go wrong the craving is likely to be more intense. At these times she feels as if she must hold herself to keep from going out to get a drink. At communion service the taste of unfermented wine makes her "mad" to drink the whole cup. The craving is not a thirst, and it is very different from the craving she used to have after drinking. Then she would tear everything to pieces to get a drink. Would walk from the battery to Harlem for it. Her craving, as nearly as she can analyze it, seems to be a longing made up of depression, increased sensitiveness to slights of all kinds, and a general nervous irritability.

The testimony of all the men who were questioned upon the subject goes to show that the craving for alcohol is a rather unimportant part of the intoxication impulse. As one expressed it, "the craving for alcohol is more than a desire to take a drink, it is the craving for something which accompanies it." With one or two exceptions the testimony is that after a man has been without drink for a few days (10 days is the

time mentioned in most cases), there is no longer a craving for alcohol. This is especially true when a man is so situated that liquor cannot be obtained. This testimony is emphatic, and there is no doubt whatever of its correctness as far as the introspection of the subjects will go. The testimony is equally as emphatic that for the first few days the craving is often intense, that there are physiological accompaniments, such as a general distress, burning in the throat or stomach, weakness and trembling. The usual reply, when a man was asked whether he felt the loss of liquor when it could not be obtained, was, "I never think of it," or "It never bothers me at all." On the other hand, the testimony is equally strong that tobacco is missed. There can be no doubt, whatever, of this difference of feeling. The change of expression of the face when tobacco is mentioned cannot be mistaken. Many say, "I think of it every day." As to the interpretation of these facts, a partial explanation of the difference is to be found in the fact that tobacco is sometimes obtained in jail and is secretly used. The thought that there is a possibility of obtaining it keeps alive the craving. Another reason is the fact that tobacco is not regarded as the cause of the disgrace and annoyance of imprisonment. Another cause, and in all probability the most potent of all, is the social condition of a man in prison. Tobacco is, perhaps, most enjoyably used when a man is alone and inactive. It is a solitary habit quite as often as a social habit, and the solitariness of prison life continually suggests the use of tobacco. The alcohol habit on the other hand is not a solitary habit in most cases. The conditions of prison life are unfavorable for keeping alive the desire for drink, which is in general an accompaniment of the social consciousness. It is certain at least that whatever longing or craving a drunkard in prison may have, it is not recognized by the man himself as a craving for alcohol. The only real conscious craving, so far as can be discovered, is in the neurotic cases. The clearest example of a craving for alcohol is case 25. In this case there is doubtless a nervous disturbance of some kind which is periodic, and which is interpreted as a craving for alcohol. This may be an erroneous judgment on the part of the subject. The strongly fixed belief, that there is indelibly stamped into her organism a craving for alcohol, no doubt tends to keep alive the craving. It is certainly nothing more than association, which makes her "mad" to drink all the unfermented wine at communion.

In other cases the effect of the popular belief in the organic nature of the alcohol habit, instilled into the mind of the drunkard by people who are trying to help him, is evident in making him lose hope, if it does not actually take away the possibility of cure.

Further evidence of the mental nature of the craving for drink is furnished by the cures. The conversion and moral cures are confessedly mental. They cure the craving for drink by changing the general life interest. Leuba¹ gives in detail several cases in which the drink craving was taken away instantly by conversion. From this article the following are quoted :

Man, 42. Converted when 33. Sometimes drunk for a week together. Then not a drop for a whole month. Never went more than a month but once, when he joined the Good Templars, when he went without drink for three months. He experienced sudden conversion. "From that hour," he says, "drink has had no terrors for me, I never touch it, never want it." Another says, "I believe that God took away the appetite for drink that night when I asked him. Man, 44. Converted in 1883. Had been a hard drinker. Made many resolutions, but could not keep them. Had a sudden sense of powerlessness, experienced conversion. Conversion took place on Sunday. "On Monday," he says, "there was no desire for drink." "Since that day I have not had to surmount strong temptations."

Two of my own cases show well the mental nature of the cures for intemperance.

Case 26. Man, 48. First drink at eighteen with a crowd. Became a settled habit at 28. Drank every day. Began on beer, and about 28 changed to heavier drinks. Would go two months drinking everything then stop for a week from physical incapacity to drink anything more. Drank to keep up an exhilaration so that he could do more work. Drank when he hated the taste of liquor, and could hardly get it down. But had to take it in order to appear right. Took more and more as time went on. Before he was 38 had tried to reform several times. Changed his residence, but it did no good. Always drank alone for the reason that he did n't want any one to know about it. Never stayed in a saloon longer than was necessary to get what he came for. When 44 he had been drinking very hard, and his wife made him promise to try to reform, urging him to become converted. He had always scoffed at the idea that change of heart would do it, but went to a clergyman and told him that he would sign the pledge for a year. The clergyman would not accept it, so he made out a life pledge and signed it. Gave his wife all the money he had except a very little, thinking that if nothing could cure him, he would buy some liquor. For a few days, after signing the pledge, he was terribly weak and unable to act. All the time there was a craving for liquor. He knew that it would put new life into him and make him act. The craving was settled in one day. It suddenly occurred to him that he was not more than half honest in the matter, so he went to his wife and gave her the rest of the money and confessed his intentions. As soon as he had done that, it seemed as if the craving was entirely changed and from that time on, until nearly three years after, he had no craving for alcohol. His health was good, worked at the hardest kind of work, chopping in the woods, and, so far as he knows, felt no effect of his hard drinking after the first two weeks. At the end of three years, when on a visit to a summer resort, he drank two glasses of cider. The next day he was as weak as ever. Found out that the weakness had not healed, became frightened, fearing that his drink habit would return, and started

¹Leuba: A Study in the Psychology of Religious Phenomena. *Am. Jour. of Psychology*, April, '96, Vol. VII, No. 3, pp. 309-383, Appendix.

away in the rain to walk seven miles to the depot. When he reached the first house, he stopped and asked for a drink and got it. Got some more a little further on. This commenced a downfall more complete than the first. He has continued drinking up to the present time. Says that he has to have alcohol to keep him steady, and to make him think. If he goes a day without it, his nerves seem to be shattered. Thought he could n't add a column of figures unless he had his drink in the morning.¹ Has a craving for liquor which he cannot resist.

Case 27. Man, 44. Was through college at 18. Went to work in a bank. At 22 began to drink steadily, brandy and port wine being his favorite drinks. Drank for the taste of the liquor mostly. Belonged to clubs, and drank at socials. Soon began to use liquor to excess, and drank both for the taste and the feeling. It was steady drinking all the time. Drank in company altogether. Later, drank alone but never to get drunk alone. There was hardly a day that he did n't drink excessively, although he never went to extreme intoxication. The last two years of his drinking (from 42 to 44), did n't try much to control his appetite. Kept up his business, and used to do better work after he had three or four drinks. Was doing some literary and lecture work at the time. Always drank heavily before going to make a speech. Stopped drinking in April, 1894. Had been to a kind of a racket at a club, drank heavily all night. In the morning was walking around with three or four men. It suddenly occurred to him that he was living a useless life, told the men he was with that he was not going to drink any more. They laughed at him and told him that he could not stop. Drunk as he was, he sat down and made out an agreement not to drink any more from April 14 to July 4. This he agreed to sign if one of the others would. One agreed, so he signed the paper and handed it to the other man. The other one remarked that as long as he had the agreement, he guessed he would not sign it himself and put it into his pocket. This angered him and he made up his mind to keep the agreement, whether the other man did or not. Did not drink any more that day, left the men at four o'clock and went home sick. Went to a doctor who told him that he would have to stop by degrees, or it would kill him. But he refused to drink. After a week there was no craving and he refused liquor ten times a day for the next six months. He has never drunk since. Very frequently now he goes into a saloon with friends, but always calls for non-alcoholic drinks. The odor and sight of liquor do not arouse in him any craving. He has noticed that since he stopped drinking he cares less for the society of men and feels that in a way his social feeling is weakened.

In other cures the principle is psychic. Most of the inebriates' homes depend upon moral instruction and social environment. The principle of such a cure as the Keeley Cure is largely, if not altogether, mental. In the methods, which are used by regular practitioners, reliance is placed upon general tonics and moral influence. Other cures make use of substitutes which have an effect similar to alcohol. Emetics are given which create an association of nausea with the taste of alcohol.

The evidence from the cases indicate that the craving for drink is not a craving of childhood. In the few cases in which

¹ A series of tests on four consecutive days during which he took no alcohol, disapproved this, however. He did better each day, and much better than when he was using alcohol. During his abstinent days he felt no craving for liquor because 'he knew he was not going to have any.'

the first drink was taken at nine or ten the real history of the case does not begin until some years later. In general, if our cases are typical, drinking does not begin during school life. In a great majority of cases the first drink was taken after the boy had left school and had begun to associate with older men. The beginning was almost always social. In but two instances was the first drink taken alone. There are one or two instances in which the first drink was taken after 40. In the latter cases alcohol was taken by a doctor's orders, and the habit thus formed was never broken. Below is given a table showing the age at which the first glass was taken in 65 cases.

Table showing when first drink was taken in 65 cases.

AGE.	NO. OF CASES.	AGE.	NO. OF CASES.	AGE.	NO. OF CASES.
9	1	20	6	31	0
10	1	21	1	32	0
11	1	22	5	33	0
12	2	23	0	34	1
13	0	24	1	35	1
14	5	25	3	36	0
15	6	26	2	37	0
16	10	27	2	38	0
17	8	28	0	39	1
18	5	29	0	40	1
19	1	30	1		

Below are tabulated 498 cases¹ of inebriety with reference to the time when the drinking habit was formed. This does not refer to the time when the first drink was taken, but when more or less regular drinking began.

By referring to the tables it will be noticed that among the 65 cases more took the first drink at 16 than at any other year. At 20 is the greatest tendency for drinking to become a habit.

Parrish² says that the drink craving does not declare itself until the demands upon the nervous system come to be exorbitant, and that its terminal period comes with as much certainty as does its initial stage. He thinks 'that there is an inebriate climacteric in every life, when nervous periodicities become faint, when internal and external excitants to intoxication lose much

¹These cases are from statistics taken from Thomann's *Real and Imaginary Effects of Intemperance*.

²Alcohol Inebriety, 1883.

Table showing age at which drinking was commenced in 498 cases.

Age.	No. of Cases.		Age.	No. of Cases.		Age.	No. of Cases.		Age.	No. of Cases.	
	Males.	Fem.		Males.	Fem.		Males.	Fem.		Males.	Fem.
10	2	0	22	32	2	33	10	5	43	1	1
11	0	0	23	21	1	34	8	4	44	2	2
12	4	0	24	22	0	35	9	2	45	2	0
13	6	0	25	17	4	36	3	2	46	1	1
14	8	0	26	14	3	37	2	2	47	1	0
15	26	0	27	16	2	38	2	0	48	2	0
16	14	2	28	13	3	39	1	4	49	5	1
17	19	0	29	8	1	40	3	0	50	3	0
18	35	1	30	20	5	41	1	0	51	1	0
19	18	2	31	4	0	42	2	1	52	1	0
20	50	3	32	3	1				53	0	0
21	29	0							54	2	0

of their vigor, and the inebriate diathesis is too feeble to respond to excitation. Between forty and fifty a great number of spontaneous recoveries occur. Between fifteen and twenty-five most cases begin. About twenty-five years closes the drinking period, either by exhaustion of the desire, or by death.' Crothers¹ says 'that there are periods from seventeen to twenty-five and from thirty to forty in which the liability to contract the drink habit is greatest. This is most likely to die out between forty-five and fifty, or from fifty-eight to sixty-two. The physiological changes of mature life bring changes of nerve vigor and growth, periods closely corresponding to the evolutionary periods of women.' Superintendent Hadley, of the McCauley Mission in New York City, says that most conversions of drunkards take place between the ages of thirty and fifty. Dr. Braintwaite,² Superintendent of the Dalrymple Home in England, says that most of the cures take place between thirty and forty-five, though many cases do well older, up to fifty-five and sixty. The younger cases are most unsatisfactory. He says "very few, indeed, succeed in getting right under twenty-five or twenty-six." If the physiological basis of the drink craving is the change of protoplasm, due to the continued assaults of alcohol, as many maintain, it would be difficult to account for the fact that young men are, as a rule, less easily cured than older men.

From the data obtained from these cases we can simply enumerate the usual motives which lead to intoxication. For a quantitative estimation of these motives a much greater number of cases would be needed. They are as follows: (1) a desire for excitement, experience and abandon; to increase companionship, to put off reserve in the presence of others. (This desire to heighten the social feeling is probably the most prominent cause

¹ In correspondence.² In correspondence.

of drinking. Many drunkards would regard it as a disgrace to drink in any other way than socially.) (2) To kill pain, to calm moral distress, to overcome fatigue, a desire for temporary relief from poverty or monotony; to increase courage or overcome self-consciousness, to steady the nerves for work or unusual strain.

Thus far we have found evidence to lead to the conclusion that the craving for alcohol, as felt by the drunkard, is not a specific craving, and that when the occasion of drinking is removed usually nothing remains of the craving as such, or it is so merged in other desires that it is not recognized by the subject. A drunkard is what he is because he enjoys a certain mental state, which is most conveniently induced by alcohol. This mental state is very closely associated with the social impulse. The moderate drinker, who never drinks to intoxication, belongs to quite a different class. He drinks, for the most part, because he likes the taste of alcoholic beverages.

§ 5. EFFECT OF INTOXICATION UPON THE LITERATURE AND LANGUAGE.

Intoxication, like all peculiar and abnormal mental states, is a subject of natural interest to primitive people, as is shown by the influence it has exerted upon the language and literature. In fairy tales intoxicants are often spoken of. The love potions and philters, elixirs and waters of life are often stimulants and narcotics, as well as aphrodisiacs. Of the gods of wine Dionysus of the Greeks and Indra of the Hindus are best known. Drunkenness was also honored by divinities among the ancient Mexicans.

Among primitive peoples the common element in the myths of wine is the belief in its divine origin. Intoxicants are believed to lift the soul up to a higher level, to bring it into touch with divine powers. Wine is often included among the pleasures of the next world.

The remarkable influence that intoxication has had upon the popular mind¹ is shown by the great number of synonyms for the state which have been in common use. No other thing except the sexual relationship has made a deeper impression upon the popular language. Below are given a few synonyms collected from the slang literature and other sources. No attempt was made to make the list even approximately complete. Some purely local expressions are included. Translations from German and French have been omitted.

¹Ribot, quoting from Renan says, "a people have usually many words for what most interests them." (*Evolution of General Ideas*, p. 76.)

Most of these terms are expressions of contempt, having reference to the disabled stage of intoxication. A few, like inspired, electrified, jolly, glorious, exalted, refer to the stimulated stage.

Synonyms for Intoxication. A bit on, addled, off, all key holes, all mops and brooms, all sails set, a passenger in the Cape Ann stage, artificial, at rest.

Bacchi plenus, back teeth afloat, bamboozled, banged up to the eyes, battered, beastly, been among the Philistines, been at a ploughing match, been flying high, been hit by a barn mouse, been lapping the gutter, been in the sun, been rushing the growler, been sucking the can, been taking bitters, been taking tea, beery, bended, bitch fou', blowed, blind drunk, blowing, blued, blue eyed, boiling drunk, borey-eyed, boosey, breezy, brick in the hat, bright in the eye, bruised, budgy, buffy, bummy.

Canonized, can't say "National intelligence," can't see a hole in a ladder, caught a fox, caught favor, channels under, chirping merry, chuck full, clear, clinched, cocked, come from Liquor pond street, comfortable, concerned, corned, cosey, coxy-loxy, croaked, cronk, crooked, crook-in-the-elbow, crying drunk, cup-shot, cut.

Damaged, dazed, dead drunk, dipped deep, discouraged, disguised, done over, doped, down in the mouth, down with the barrel fever, drowning the shamrock, drunk, drunk and disorderly, drunk and dressed up, drunk as an ass, drunk as a biled owl, drunk as a brewer's horse, drunk as a drum, drunk as a fiddler, drunk as a fish, drunk as a fly, drunk as a Gassport fiddler, drunk as a lord, drunk as a mouse, drunk as an owl, drunk as a pipey, drunk as a tapster, drunk as a rat, drunk as a sow, drunk as a wheelbarrow, drunk as Bacchus, drunk as Chloe, drunk as he can hang together, dry, dull in the eye.

Edge on, electrified, elevated, exalted.

Faint, far gone, feeler on, feels good, feels his oats, feels right royal, feverish, filled to the brim, flag of defiance out, flatch kennurd, flawed, fluffy, flummoxed, flush, flushed, flustered, flusticated, fly blown, flying high, fogged, fogmatic, forward, fou', four sheets to the wind, fow, foxed, fresh, fuddled, full, full cocked, full of ballast, full of pots, full of rum, full to the brim, full to the bung, fuzed, fuzzy.

Gilded, gilded o'er, gilt edge on, glorious, google eyed, got a big head, got a bundle, got a drop in the eye, got a smile on, got the gravel rash, greetin fou', groatable, groggy, gutter legged, guzzled.

Had an eye opener, half and half, half cut, half on, half shot, happy, hard up, hasn't got his sea legs, hazy, headed for port, head light on, head on, heady, hearty, helpless, high, high lonesome, hilarious, holds up the lamp post, hoodman, hot, how came ye so, how far ye.

In a difficulty, in a very good humor, in his altitudes, in good fettle, in good spirits, in his cups, in liquor, inspired, in the blues, in the gutter, in the wind, intoxicated, irrigated, iskommish.

Jagged up, jag on, jammed, jib well bowsed, jim jams (has the), jolly, joyful, jug-steamed.

Kisky.

Laid away, leary, leery, legs broke, limber, loaded, loaded for bears, loaded to the gunwales, load on, looking lively, loose, lumpy, lushed, lushy.

Main brace well spliced, making m's and w's, martin drunk, mawled, medza-beargear, mellow, miraculous, moony, moppy, mortal, muddled, muggy.

Nazie, night cap on, not in a fit state for discussion.

Obfuscated, off his nut, on a blow out, on a bust, on a hurrah, on

a skate, on a spree, on a tear, on a triumphant, on his fourth, on the batter, on the beam end, on the beer, on the bend, on the fuddle, on the gay galoot, on the lee lurch, on the loose, on the muddle, on the nipple, on the rampage, on the ran-tan, on the re-raw, on the skyte, on the stuff, on the tiles, one sheet in the wind, ossified, out of funds, overcome, overstocked, over the bay.

Paralyzed, peckish, petrified, pickled, pificated, piper fou', ploughed, podgy, pretty well entered, primed, pruned, pushed.

Queered, quaffed the bowl.

Raddled, rather touched, razzle-dazzle, reeling, right, Romeo, roaring, roaring drunk, roaring fou', rococo, rotten drunk.

Salted down, salubrious, sawed, scammered, screwed, sees two moons, set up, sewed up, shaking a cloth in the wind, shaky, shaved, shocked, shot, shot in the neck, skaty, skate on, sleepy, slewed, smashed, smeekit, smelling of the cork, smoled, snakes in his boots, snubbed, snuffy, soaked, society slant on, soft, spiff, spiffed, spoon drunk, spoony drunk, spreeish, sprung, squiffed, staggering full, starchy, stewed, stimulated, striped, stropolus, stuffed, sun in the eyes, swiped, swipecy.

Taking it easy, tangle legged, tanked up, tavered, thirsty, three sheets in the wind, tight, tight as a brick, tipsy, tired, tired feeling (has), titley, too much fire water, took a snort, top heavy, touched, turkey on his back, twisted, two sheets in the wind.

Unco', under the weather, under the influence, unsteady, up a tree.

Walks on a bias, water logged, waving a flag of defiance, weak-jointed, weary, well under way, wet, whipped, whittled, winey, wobbly.

Yappy, yaupish.

Intoxication as it appears both in poetry and prose furnishes a field for psychological study. The deepest motives for intoxication are expressed here. Of these there are two which run through all the literature. One is the glorification of pleasure and abandon, the other is the desire to escape from pain. The best example of the first is found in the Greek dithyrambic poetry.¹ A spirit of abandon, love of exaggeration and excess, extravagance of language appear everywhere in the literature of drink. Such verses as the following show this spirit:

"When I am dead with wine my body lave,
For obit chant a bacchanalian stave."

—*Omar Khayyám.*

"The dry and dusty earth drinks,
The trees too drink her moisture;
The sea doth drink the rivers,
The sun doth drink the sea waves,
The moon doth drink the sunbeams,
Why cavil then at me, friend,
That I am fond of drinking?"—*Anacreon.*

In the college song books drinking is the most common theme, excepting, perhaps, love. Here the spirit is for the most part, like that of the Greek dithyramb, one of jovial excitement; but

¹ See § 2.

there is not wanting a shallow pessimism. The praises of drink as a cure for care and trouble are frequently sung. In Heilbrom's "Carmina Clericorum" fifteen of the thirty-one songs are praises of drink.

But there is much of the spirit of deep pessimism running through this literature. Omar Khayyám, to take a single example, expresses well the narcotic motive in intoxication. Fitzgerald¹ criticises those who interpret the quatrains of Khayyám as symbolic, clothing the deity under the figure of wine, as did Hafiz and other Sufi poets, saying that Khayyám is just what he seems, a material epicurean. There is a fine thread of pessimism running through all his poetry. He frequently refers to the wheel of heaven and the world's injustice. He hates the hypocrisy of the pious, and bitterly charges the sins of men to the account of the Creator. For him wine was a means of relief from trouble.

"Endure this world," he says, "without my wine, I cannot
Drag on life's load without my cup, I cannot."

And again.

"Life is a poison rank, and antidote save
Grape juice there is none."

Khayyám speaks frequently of his sin. It was quite evident that he was a drunkard, for he says:

"I am a slave of that sweet moment when
They say take one more goblet and I cannot."

And, as in the case of many other drunkards, wine dimmed for him other pleasures.

He expresses in verse what many drunkards say when he cries—

"They preach how sweet these Houri brides will be,
But I say wine is sweeter, taste and see!"

Much might be added to the account of the influence of intoxication upon literature. Its interest is, however, rather for the psychology of literature and language than for the psychology of intoxication. But one must certainly be impressed with the very great influence intoxication has had, especially upon religious belief, and upon imagination and its expression in language.

The doctrine of stimulus. The doctrine of stimulus in the history of medicine is very closely connected with intoxication. The dualistic philosophies coming from Plato and Aristotle, which placed the soul and life in contradistinction, and even in opposition to body and matter, were absorbed into the theory of medicine at an early date. Life was regarded as an entity or principle which opposed or controlled the body. In order to

¹ The Quatrains of Omar Khayyám (Introduction).

cure disease this vital principle must be spurred on to increased effort. Hence the disproportionate use in medicine of drugs which affect the brain and thus change the mental condition, and the slow adoption of drugs which, because they affect organs not connected with consciousness, act in a less noticeable manner.

A long list of early physicians including Galen, Paracelsus, van Helmont and Hoffman, held doctrines similar to each other, in that they assumed a life principle which presided over the development of the body, and which needed stimulation in order to overcome disease. The modern doctrine of stimulation (an excitement of normal functions) is obtained by transferring this hypothesis from the life principle to the tissues of the body itself.¹

§ 6. ANALOGUES OF THE INTOXICATION IMPULSE.

There are many facts which show that there is a normal love or craving for certain states of consciousness, the common element in which is intensity. Examples of such are the love of mental excitement and high emotional states common among children, religious ecstasy and excitement, second breath (mental and physical),² dances, violent games involving both mental and muscular activity, social excitement. Psychologically considered these states are very similar to each other, and a study of them leads to the conclusion that intoxication is one form of expression of a more general impulse which is deep-seated in consciousness and very far-reaching in its effects.

States analogous to intoxication appear in animals, in some species of which states of exaltation are habitual. They are, apparently, more common in birds, but occur also among mammals. One or two accounts of these serve to illustrate this phenomenon which appears in all degrees of intensity from a slight increase in activity to orgiastic performances of the wildest kind.

Besides the various plays of animals, in which there appears to be a love of excitement for its own sake, there are other rhythmically occurring periods of intense excitement. Chapman³ describes the sky dance of the woodcock as a succession of wild rushes in the air, with always increasing speed and with louder and louder cries, the object of which seems to be to rise to the highest pitch of excitement.

Worth describes a dance of prairie chickens or sharp tailed grouse.

¹ For a full account see Anstie : Stimulants and Narcotics.

² Partridge : Second Breath. *Ped. Sem.*, Vol. IV, p. 375, *seq.*

³ This and the following descriptions are from Morgan : Habit and Instinct.

The birds, in companies of from six to twenty individuals assemble on some hillock or knoll fifty to a hundred feet across, the floor being worn and beaten smooth by years of tramping. After remaining for a time inactive, one of the cocks lowers his head, spreads out his wings nearly horizontally, and his tail perpendicularly, distends his air sacs and erects his feathers, then rushes across the floor, taking the shortest of steps but stamping his feet so hard and so rapidly that the sound is like that of a kettle drum, and at the same time he utters a kind of bubbling crow which seems to rise from his air sacs, beats the air with his wings and vibrates the air with his tail, so that he produces a loud rustling noise and thus becomes a really astonishing spectacle. Soon after he commences, all the cocks join in rattling, stamping, drumming, crowing and dancing furiously; louder and louder the noise, faster and faster the dance becomes, until at last they madly whirl about, leaping over each other in their excitement.

Hudson in "Music and Dancing in Nature," speaks of the screaming contests of Platan rails, and remarks upon the striking resemblance to the human voice exerted to its utmost pitch and expressive of extreme terror and despair. Wallace says: "We see that the inferior animals, when the conditions of life are favorable, are subject to periodical fits of gladness affecting them powerfully and standing out in vivid contrast to their ordinary temper. Birds are more subject to this universal joyous instinct than mammals, and there are times when some species are overflowing with it."

Groos also speaks of the above mentioned characteristic of animal love dances and play, and explains the intense excitement on the ground that it is necessary that the sexual impulse should have tremendous power, and its discharge be rendered difficult; hence the great and long-continued excitement preceding the act of pairing.

Many examples of a similar love of excitement occurring in the human subject, especially at times of accelerated development might be described. At the adolescent period, when impulses to new lines of action have developed more rapidly than self-control, intense sensation, strong emotional excitement, and even immorality often have a peculiar charm, even for normal people. Monotony, routine, and detail are unendurable. Particularly in the social and collective life is this spirit of sensationalism shown. The queer freaks and the breakings-out and the excesses of college students illustrate both the intensity and the imaginative fertility of this craving. Lancaster¹ speaks of the sudden and inexplicable rebellion against authority which appears in the first years of adolescence.

Primitive peoples also show an intense love of excitement in almost every social event of their lives. A culmination in intense excitement is very frequent, in fact a customary and natural

¹Psychology and Pedagogy of Adolescence. *Pedagogical Seminary*, July, 1897, p. 85.

termination of all gatherings of uncivilized man, whether for religious or for social purposes. The various shaman cults are as good an example of this tendency as any. A festival lasting a number of days usually has a culminating day or period, or it may end in a wild dance or in general intoxication. A moderate height of excitement maintained for a considerable period of time seems to be unnatural to primitive man. Dancing, especially when, as so often occurs, it is accompanied by intoxication, affords an excellent example of the tendency. A few illustrations will bring out more clearly this characteristic of the mind, which is not confined to any single function of the social or religious life, but is found everywhere,—at marriages, funerals, games and simple social gatherings. But more particularly the public festivals and dances are occasions of throwing off of all control and giving the mind over to the intoxication of movement, of sexual excitement, and general abandonment. Intoxicants may or may not be used to induce these intense states. Pain, scourging, games of torture, fasting, fantastic sights, and hideous sounds, as well as violent movements all serve the same purpose. Public festivals which begin with much dignity often degenerate into scenes of wild disorder before they are finished. The great war dance of the Tupis is an illustration.

They arranged themselves in groups, and at a well known signal each group began to sing, at first in a low tone of voice, which became louder and terminated in dreadful yells and hideous howls. The jumping was so violent and their efforts were so furious that some of them fell senseless to the ground. Three or four payes or sorcerers stood in the center, shook the tamarak, and blew tobacco smoke from a cane pipe upon the dancers.¹

Mrs. French-Sheldon² says, speaking of some of the customs of the natives of East Africa.

“The young fellows will collect in groups and dance as though in competition; they dance with their knees rigid, jumping into the air until their excitement becomes very great and their energy almost spasmodic, leaving the ground frequently three feet as they jump into the air. At some of their festivals this dancing is carried to such an extent that I have seen a young fellow's muscles quiver from head to foot, and his jaws tremble without any apparent ability on his part to control them, until, foaming at the mouth and his eyes rolling, he falls in a paroxysm upon the ground to be carried off by his companions. This method of seeking artificial physical excitement bears a singular resemblance to the dances of other nations outside of Africa.”

Examples of this tendency might be multiplied to any extent. The reader is referred to the literature of plays and games and dancing.

¹ Featherman: *op. cit.*, Vol. III, p. 341.

² Customs among the Natives of East Africa. *Jour. Anthropological Inst.*, 1891, p. 367.

Certain historic periods seem to have been characterized by a love of excitement. This is well shown by the Dionysiac cults in Greece.¹ It also occurred, in a remarkable degree just before the intellectual awakening at the time of the Renaissance, especially in Italy. All students of the period seem to agree that it was a time of extreme sensuality, accompanied by a love of display and dramatic effect. It was a time of great church feasts, and great civic processions. The carnivals in Venice, in particular (1459), were famous for their great torch-light processions.²

Other changes in the national consciousness accompanied this craving for new and strong sensations. Burckhardt³ says: "In the Middle Ages man was conscious of himself only as a member of a race, people, party, or corporation, but now the subjective side asserted itself and man became a spiritual individual and felt himself as such. Adams⁴ says that the Renaissance was more than a revival of learning. It was a revival of emotions also, an awakening of man to a new consciousness of himself and of the world. The work of the Renaissance was to awaken in man a consciousness of his powers and to give him a confidence in himself. It was a craving for freedom which more than anything else characterized the times. There was a change from outer to inner control and the result was a time in which there was no control at all. Hence the great vices of the period. Burckhardt⁵ sums up the character of this age by saying: "The fundamental vice of this character was at the same time a condition of its greatness, namely, an excessive individualism. This immorality was a historical necessity; with it has grown up a modern standard of good and evil." He apologizes for the immorality of that day by saying that it was not of low order. Symonds⁶ also takes this ground in explaining the illicit loves of this time, saying that they were not merely sensual, but were due in great measure to the demand for imaginative excitement in all matters of the sense.

A striking sex difference appears in all these activities, not only as they occur among animals, but also in the human subject. Ellis⁷ says that among primitive peoples the occupations which require intense activity alternating with long periods of apathy are chosen by the male. The monotonous work falls to

¹ See § 2.

² For a full account of this period see Burckhardt: *The Civilization of the Period of the Renaissance*, and Symonds' *Renaissance in Italy*.

³ *Op. cit.*, Vol. I, p. 181.

⁴ *Civilization during the Middle Ages*, p. 365.

⁵ *Op. cit.*, Vol. II, p. 246-7.

⁶ *Op. cit.*, Vol. I, p. 411.

⁷ *Man and Woman*, p. 2.

the lot of the women. It is true also of intoxication, that it occurs far more frequently among men than among women.

A consideration of other secondary sexual differences between male and female shows a similar tendency. Geddes and Thomson¹ speak of the more active physiological habit of the male. His activity is more katabolic; he lives at a greater loss; the physiological habit of the female is more anabolic. Taking all the above described phenomena into account, the most probable explanation is that they are expressions of a general instinctive tendency, and that it has been preserved because it has favored mental development. Granted the existence of an instinctive impulse to seek intense states of consciousness, its preservation can easily be accounted for. (1) It is a direct accompaniment of a healthy and vigorous state of the organism. (2) Intense excitement may have been of service in connection with the regulation of the sexual impulse (Groos). (3) It also serves in the individual as a propædæutic to higher forms of emotional and mental activity. (4) The forms of activity resulting from this impulse have had a very great social value. (5) They have also by favoring activity led to a natural experimentation which has assisted adaptation (Morgan).

At the present time the ability to endure long continued mental activity at a high degree of tension is one of the essential qualities which favor success. For a life of mental activity the excitement and love of strong sensations at the time of adolescence is natural training. There is no reason to believe, therefore, that this impulse will decrease, but rather on the contrary that it will increase, favoring a greater capacity for intense states of consciousness. Directly in line with the conclusion that the forms of activity mentioned above are expressions of a general instinctive tendency is the theory of play as held by Groos. The conclusive argument against the overflow theory of play, as held by Spencer, applies directly to the forms of activity under discussion here, and favors the conclusion that the impulse to seek intense states of consciousness is not an expression merely of a high state of nutrition, but a true instinctive tendency which has grown up as a necessary aid to mental development. Like all other forms of instinctive activity, it may be exceedingly active even in organisms in which a low state of nutrition causes it to be a source of peril, or even destruction.

Doubtless there are conditions of nervous exhaustion in which the craving for excitement becomes abnormal in degree. The sensuality of the decadent days of great nations may be explained as an expression of exhaustion. In the sensuality which followed the Napoleonic wars in France there is a good example of the effect of overstrain and fatigue in causing

¹The Evolution of Sex. pp. 18, 270.

a craving for excitement and for new sensations. This impulse found expression in the literature of the time, perhaps most characteristically in Huysmans, the novelist.¹

§ 7. RÉSUMÉ AND CRITICISM OF THEORIES OF THE INTOXICATION IMPULSE.

In the following section abstracts are given of various theories of the intoxication impulse and the craving for alcohol. Some of these theories are uncritical, but taken in connection with others they show tendencies of thought.

A prevalent opinion about the alcohol craving, one which makes up the philosophy of many who advocate temperance, is that intoxication is a form of sin, and needs little explanation. Another view which explains nothing is that the craving for alcohol is a diseased appetite.

Baer² thinks that the craving for alcohol is not an instinctive but an acquired craving.

Gustafson³ says that the desire for alcohol is a habit becoming instinctive and a form of depraved second nature.

Nordau⁴ says that the craving for alcohol is a craving for relief from pain and an expression of a need for stimulation, there being a general condition of neurasthenia, especially noticeable in the upper classes of society and due to the fatigue caused by the sudden incoming of machinery, rapid transit, and exciting occupations. Lett⁵ asks "Why do men drink?" and gives about the same answer as Nordau. "Because there is pain. The healthy man has no pain and needs no stimulant. One kind of pain, unrest, is the outcome of an unstable nervous organism. Disquietude, unrest, pain are the causes of drinking."

In an anonymous article in the *University Magazine*, entitled "The Philosophy of Stimulants," a writer expresses the view that stimulants and narcotics are used because they intensify consciousness; they make wider variations in life; our pleasures and pains are too evenly distributed, and it is a matter of instinct with us that we try to summate them.

Moxon⁶ says that alcohol weakens common sense in its opposition to individual sense. The power of alcohol in the world is that it keeps down the oppressive power of others and their common sense over the individual sense. Alcohol raises a man's

¹ Leuba: National Destruction and Construction in France as seen in Modern Literature and in the Neo-Christian Movement. *Am. Jour. Psychology*, July, 1893, Vol. V, No. 4, p. 498.

² Der Alkoholismus; also Die Trunksucht und ihre Abwehr.

³ The Foundation of Death.

⁴ Degeneration.

⁵ The theories of Lett, Monin, Hughes, Day, Danielewski and Forel are to be found in scattered articles in the *Journal of Inebriety*.

⁶ *Popular Science Monthly*, 1879, Supplement, N. S. I, p. 30.

individuality temporarily. It reduces the common sense relations between men.

Thomann¹ says that the desire for alcoholic beverages is generally a physical desire, an animal lust.

Monin says that in proportion as civilization perfects itself man seeks in drunkenness a compensation for, and a forgetfulness of, the weariness and chagrin which result from his daily struggle for existence.

The supposition of all those who believe in a specific for the craving for alcohol is that it is a physical appetite which can be destroyed by the use of drugs. A statement of the views of a single one of these will be sufficient to illustrate these medical theories. He has two specific remedies, one to remove the neurasthenic condition which he says is present in all cases of inebriety, and another to remove the craving for alcohol. With these he claims to cure men of all ages in any stage of the disease, and to establish such a normal condition of body and mind that although they may drink again they will never drink again from necessity, or because they are victims of an appetite, but only from choice. He maintains that the craving for alcohol and the desire for stimulants in general, such as hasheesh, morphine, and chloral, are expressions of one disease; they all have their roots in a neurasthenic condition. Other cravings, such as a passion for strong electrical stimulation, are of the same nature, the expression of a lowered nervous tone and a desire for something which will create activity in inactive organs.

The advertisements of specifics which can be administered to a drunkard without his knowledge and cure his desire for alcohol, also illustrate this pseudo-medical and popular view that drunkenness is caused by a diseased craving.

Hughes says that the drink craving is a pathological perversion of physiological cell action, and lies in the realm of the cerebral cortex.

"That there is an organic appetite for brain stimulants which, if not originally so, has become organic through unknown ages of indulgence common to man," says Day, "is beyond dispute. This appetite does not anticipate for its gratification more than the primary or stimulating effects of the drugs used. It is through this appetite that the system is often exposed to an unexpected and undesired effect of the drug and a painful condition of the body induced by such unintentional excess, which can in no other way be so speedily and effectually relieved temporarily as by the repetition of the excess itself, by renewed

¹ *Op. cit.*

stimulation of the organs suffering, or in an obliteration of sense by a more complete narcosis than was at first intended."

Braintwaite¹ says that drunkards are made by the effect of alcohol upon unformed and developing tissue, especially cerebral tissue.

Danielewski says that civilized man has used alcohol so extensively, and for so long a time, that one may with certainty affirm the existence of an alcoholized protoplasm in drunkards just as one finds morphinized protoplasm in cases of chronic intoxication with morphine. The organism can no longer do without it. Hence it follows that the complex of protoplasm and albuminoids is adaptable; that it is not incapable of being disturbed in its fundamental properties; and that it is reconstructed with difficulty.

These notes will serve to show some general tendencies of opinion in regard to the nature of the intoxication impulse.

In the views mentioned thus far no attempt is made to explain the development of the craving for stimulants, except by the hypothesis that it is a result of generations of indulgence; in other words that it is an acquired habit which is becoming a so-called secondary instinct.

Forel has also expressed a similar view in an article in which he speaks of the future of the alcohol craving in the race. "We do not think," he says, "that man could ever adapt himself to the use of alcohol and narcotics, so that they would cease to hurt him, for the following reasons. Experience teaches, (1) the general drinking and narcotic customs incessantly augment the production and the consumption, that is, increase the daily doses which every man consumes in the average. (2) The craving which alcohol and all other narcotics produce drives to such augmentation with peculiar force where severe laws do not counteract. (3) Alcohol, and probably also all other narcotics, poison not only the individual, but also his sperm, the germs of his descendants. (4) The progeny of alcoholists, according to experience, are especially exposed to mental degeneration and to drinking excesses. Their resistibility against alcoholic liquors is never raised, rather very much diminished."

Beard² asks the question, "Why does man, so much higher than the animals in every respect, alone possess the vice of intemperance?" "What makes us to differ from them?" and answers, "Mainly our nervous system." Man has a larger, fuller, richer brain than the lower animals; and stimulants and narcotics chiefly affect the brain; therefore man craves for them, finds rest and negative food and pleasure in them, and thus

¹In correspondence.

²Stimulants and Narcotics.

often becomes their slave. The horse does not care for alcohol, for the same reason that it does not care for philosophy, because its brain is not capable of appreciating it."

He says: "The most enlightened nations of our time are Great Britain, Germany and the United States, and in these countries stimulants are used in the greatest abundance and widest variety. Next to these nations in order of enlightenment and in order of indulgence in these substances are France, Russia, Norway, Sweden, Italy and Spain. The semi-civilized nations, as Turkey, Syria, India, China, Japan, South America and Mexico, use some varieties to considerable excess, but have not so many varieties, and do not, on the whole, use as great a quantity of stimulants and narcotics as the nations who are at the head of civilization. The purely barbarous races and tribes use at most but one or two varieties, and, as a rule, to but little excess. Africa seems to have used less than any other continent.

"In civilization the expenditure of force is vastly greater than in barbarism, because the brain, especially, is more active. To compensate for this expenditure, to retard the waste of tissue, or at least to sustain the body amid the cares, toils, and pressure incident to advanced civilization, men resort, not only to a more liberal and abundant variety of food than the savages use, but also most employ a wider range of stimulants and narcotics. It would seem that the use of stimulants and narcotics in general has increased with the advance of the race. In general, also, the higher civilized races use stronger liquors and more abundantly, and since in the lower races there is less moral and other restraint, we must conclude that they are not tempted to drink to excess, that they do not enjoy the exciting effects of the stimulants, as do the northerners. There is ten times as much intoxication in Great Britain and the United States as there is in Germany and France. There is far more of the grosser type of intemperance in the northern than in the southern climates. This difference is due primarily, probably, to difference in environment, climate, etc., and only secondarily to difference in race. The English, the Germans and the Americans are of all people the most energetic. Associated with this courage and vigor is a powerful development of some of the lower passions. They are fond of eating and drinking, and although less licentious, less artful than the French, Italian and Spanish, they are more addicted to coarse and brutal crimes. Coarse crimes and drunkenness are twigs growing on the same stem.

"Drunkenness and the amount of liquor consumed in a given country are independent variables. England uses more alcohol, in various forms, than America, but it has less drunkenness. In France the consumption of liquor is very great, but the French are by no means a grossly intemperate people. The explanation of this paradox is that national intemperance does not result so much from widely diffused habits of drinking as from great excess among a limited number. The poor and ignorant classes among civilized nations are most given to intoxication. They are brought into the presence of the same variety of stimulants as the higher classes, and they have less moral control. Woman, everywhere, uses less intoxicants than man, not so much because her moral force is greater, but because she has less desire for the effects of stimulation."

Beard makes much of the effect of climate in determining the difference of drinking habits in different nations. The effect of climate is to produce types of organization—the effect being shown also in psychic traits. He says "Protestant Christianity is the religion of a liberty-loving alcohol-loving people, who have a strong passion for

independence and for sensual indulgence in its most active and violent forms."

The most important of the recent views in regard to the intoxication impulse is that held by Reid. Of this a detailed account is given here for the reason that it is believed by the present writer not only theoretically wrong, but also to involve a very grave pedagogical error.

Reid is led, after a general survey of the present evolution of man,¹ to the following three conclusions: (1) That every species must necessarily undergo retrogression unless that retrogression be checked by selection. (2) That in such a high multicellular organism as man acquired variations cannot be transmitted. (3) That in such an organism, living amidst immensely complex and heterogeneous surroundings, the action of natural selection has been mainly to develop so extraordinary a power of varying in response to appropriate stimulation, direct or indirect, from the environment, such a remarkable power of individually acquiring fit variations that very much, indeed by far the greater part of the characteristics of such an organism are due to stimulation acting upon this power to vary, are variations acquired by the individual, but variations which are not transmissible. At present man's most formidable enemy is the immensely numerous class of animal and vegetable disease germs which continually threaten the safety of the race, and by ceaseless selection weed out the unfit. Moreover, immunity to one disease germ does not afford immunity to another, and each which comes into contact with man, so as to cause the destruction of a sufficient number of lives, is the object of a special process of evolution.

"On the mental side we find," says Reid, "numerous habitually used drugs and poisons which act with sufficient violence and to the harm of sufficiently large numbers of the race to be the objects of special processes of selection. The chief of these poisons is alcohol. In generation after generation alcohol is the cause of the elimination of a considerable number of the unfit in relation to it, and is the cause of considerable evolution against itself. This evolution may be in one or both of two directions, increasing power of tolerating the poison or increasing power of avoiding it, an increasing power of imbibing alcohol without ill effects, or the diminution of the craving for it, or both. But as increasing immunity to the poison means only imbibing larger and larger quantities, evolution must be in the direction of a decreasing craving for it. This is what we should expect, *a priori*, and this is what we do find. Races which have been long familiar with alcohol, like races long familiar with a prevalent and deadly poison, are less harmfully affected by it than races which have had little or no experience with it, and this because they crave less for it and drink less of it. The peoples of the Mediterranean, the Greeks, the Italians, the southern Frenchman and the Spaniard, who have lived for thousands of years in the presence of an abundant supply of alcohol are pre-eminently temperate. The natives of North and South America, Australia, Polynesia, Africa, Greenland, whether in Arctic, Temperate or Torrid zone, crave for it so much that they perish in its presence, unless we protect them with prohibitory laws. Races which lie between these extremes in regard to experience with alcohol, as the people of northern Europe, the English for example, are also between them in regard to the resistance to it."

¹ The Present Evolution of Man.

The question as to how the craving for alcohol and other narcotics, the love for those states of mind which they severally induce, arose can be answered in only one way. It can have arisen only as a by-product of mental evolution, a by-product which, in the absence of narcotics was harmless, but which in the presence of them is harmful, and against which, in races long affected by this or that narcotic, a secondary evolution has occurred. This craving, according to Mr. Reid, is a specific craving. Nothing else but alcohol satisfies it. It is not transferable, so to speak, and evolution against other drugs does not affect it.

Reid insists that traits acquired under the influence of alcohol are not due to the fact that some races are by nature abstemious, nor is it due to differences in education. The craving for alcohol is an instinct and not an acquired trait. It is comparable to hunger and thirst, or to sexual and parental love; not to a love of books or of paintings, or of country, or of a particular religious system. To quote again, "The craving for alcohol depends upon consciousness, which, in turn, depends upon the presence of nervous structure. That the germ is bathed in alcohol cannot account for the habit being developed in the child."

Racial differences in regard to immunity against alcohol craving are not due to the fact that some races are by nature abstemious, nor is it due to differences in education. The craving for alcohol is an instinct and not an acquired trait. It is comparable to hunger and thirst, or to sexual and parental love; not to a love of books or of paintings, or of country, or of a particular religious system. To quote again, "It is conceivable that a man might be reared in entire ignorance of women, but in such a case, though he knew not what he desired, he would yet crave for them, and his passive desires would instantly be stimulated into activity by their presence. So a savage of a race not rendered resistant by alcoholic selection craves unknowingly for alcohol, for that state of mind which alcohol induces. Racial difference is not due in any degree, as has been maintained, to difference in the strength of alcoholic beverages in use in the different countries. On the contrary, the strength of the craving determines the degree of concentration of the alcoholic beverages."

The degree of intoxication desired by the average individual of any race, when once that desire has been awakened in him by alcohol, is exactly in inverse proportion to the past familiarity of the race with the poison; in other words, it is exactly in inverse proportion to the amount of elimination alcohol has caused in the ancestry. The smallest amount of alcohol produces some mental change. The instinct is never entirely eliminated in any race. The differences in the races lie in the degree of intoxication desired. To quote from Reid once more what seems a very curious piece of reasoning. "The direction of the process has been toward a lesser craving from a greater craving, and in some cases, *e. g.*, the English, the process has been very rapid, since side by side with individuals who have but a little craving for alcohol are found others with a very great craving, and since it frequently happens that parents who crave but little for the poison have offspring that crave very greatly for it, *i. e.*, offspring who have reverted to the ancestral type in which the craving was very great, the greatness of reversion being due to the swiftness of the evolution, owing to which reversion to a not very remote ancestor results in a considerable change of type."

Races which have undergone evolution through alcoholic selection are liable to retrogression when the stringency of that selection is abated. When the innately intemperate have as much influence on posterity as the innately temperate, alcoholic retrogression will ensue. Thus the success of every scheme for the promotion of temperance which depends upon the diminution or extinction of the alcoholic supply, or on voluntary or involuntary abstinence from alcohol, must result in an aggravation of the craving for that state of mind which

indulgence in alcohol induces. The craving for alcohol is like sexual love, an instinct, not an acquired trait. The love of alcohol is born anew with each generation, undiminished except by alcoholic selection.

It is practically impossible to banish alcohol from our midst, and since the craving for alcohol increases with indulgence, we cannot hope that moral influence will ever result in temperance, *i. e.*, in a moderate use of alcohol.

Why not banish alcohol as we do microbes? Because no man craves for disease, and thousands crave knowingly or unknowingly for excess in alcoholic indulgence. In the face of craving for alcohol, we cannot hope to banish that poison permanently. In relation to such a disease as tuberculosis which we cannot hope to permanently banish, we ought to forbid the procreation of the unit. If alcohol were abolished, the time would surely come after the race had undergone retrogression, when any law would fall into abeyance from disuse. If temperance were founded on voluntary abstinence, the craving would eventually grow so ardent, as a result of retrogression, that no opposing traits would be sufficiently strong to counteract it. The course is to imitate alcoholic selection and eliminate those individuals who crave for alcohol to an excessive degree, at least in so far as to prevent them influencing posterity by leaving offspring.

"It is the same," says Reid, "in regard to the other narcotics. We find that the peoples who have used them the longest are less harmed by them, and have less craving for them than the people who are not accustomed to them."

The important question is, "Does evolution against one narcotic or intoxicant affect another?" It seems probable that the states of mind which these drugs induce are distinct and separate, just as the weakness against separate zymotic diseases are distinct and separate. Therefore it seems probable that a man may be strong against alcohol, but weak against opium, or *vice versa*, though a race accustomed to one may, if debarred from using it, go to greater excess in another, and the presence of one seems to shut out the others, especially when craving for the others has not been strongly awakened.

The foregoing views can be summarized briefly as follows:

The craving for alcohol is—

1. Sin;
2. Craving for relief from pain, nervous weakness or weariness incident to the struggle for existence;
3. Diseased appetite: the effect of an alcoholized protoplasm; a pathological perversion of physiological cell action in the cerebral cortex; a specific pathological craving which can be cured by a specific remedy;
4. A physical craving, an animal lust;
5. An acquired taste;
6. An organic appetite, made so by ages of indulgence, *i. e.*, a "secondary instinct;"
7. Instinct to intensify consciousness, to make wider variations in the mental life;
8. Desire to change the relation of common sense to individual sense;
9. An instinct which is a by-product of mental evolution.

Criticism of Theories of the Intoxication Impulse. All those

theories of the intoxication impulse which refer it back to the sinful nature of man are so uncritical and indefinite that they need no consideration.

The theory that the craving for alcohol is a habit which is becoming instinctive takes two forms. The first, which regards alcohol craving as a "secondary instinct," involves the transmission of acquired characteristics. One's attitude toward such a view would be determined at present by his position in regard to that problem. This theory attributes to the intoxication impulse an accidental origin, and its continuance to an accumulation of habit by inheritance. There are certainly no data to establish the theory. The second form of this theory, namely, that the craving for alcohol is due to alcoholized germ plasm does not require a belief in the transmission of acquired characteristics, but is in much the same condition as the first, as regards evidence. Environment is so complex as to make it usually quite impossible to trace a direct effect of inheritance in any given case. So far as the data studied in this paper are concerned they indicate that the craving for alcohol as such is not inherited at all. Probably no one now would deny that alcohol is capable of so affecting the parent directly as to cause degeneracy and disease in the offspring, and thus indirectly produce a tendency to the formation of abnormal habits, the indulgence in which alleviates pain temporarily. But that the germ plasm is so modified by alcohol as to produce an organism with a specific craving for alcohol is quite unsupported by any evidence. It is probable that the offspring of the opium eater is quite as likely to succumb to a craving for alcohol as the offspring of the alcohol drinker, other conditions being the same.

Cases in which there is said to be an inherited craving for alcohol, which appears even before any experience with it, need a very careful scrutiny before they are pronounced to be what they seem. One case related to the present writer by a physician will illustrate this point. A drunkard had two daughters, both of whom inherited from him a craving for alcohol. One drank at first moderately, then excessively and finally died from the effects. The other has never tasted alcohol but feels she has a craving for it. Many such cases of inherited craving are based upon just such an interpretation of feeling. It is inconceivable how one can have a craving for a thing which is totally outside of one's experience. Suggestion and fear are sufficient to account for all the facts. Another case will show how suggestion might misinterpret these longings. A man accustomed to careful introspection writes as follows: "I have never used alcohol in any form, but often in going by a saloon I have a desire to go in and get a drink. The sign,

"Frank Jones's Golden Ale," and the picture of the foaming glass, have a fascination for me especially on a hot day. Now I haven't the slightest idea what Frank Jones's Golden Ale tastes like. I may add that there is no history of alcoholism in my family.' If this man had ever had the alcohol habit, or if there were a history of it in the family, he would have concluded, no doubt, that this longing was a deep-seated craving.

A very normal man of forty remembers as a child of not more than five having once drunk something from a peculiar looking bottle. He remembers distinctly noticing that the people present exchanged sly looks and were laughing at him. He remembers liking the taste of it, and afterwards looking many times for the bottle in order to have more of the drink which he now knows was cherry rum. As he grew up remembering this childish craving he for years believed that he had an inherited taste for alcohol, as there was a history of it in the family, his grandfather being a very heavy drinker. He has since used alcohol at times, moderately, and has no tendency to fall a victim to it.

The simplest explanation to all these cases is that the inherited craving does not exist at all and that suggestion accounts for the whole matter. The facility with which alcohol habits can be exchanged for other similar habits, the effectiveness of cures which act upon the mental processes, the abrupt cessation of the craving when alcohol cannot be obtained, all point to a single conclusion, namely: that the craving for alcohol is concerned with the mental rather than with the physiological aspect of development. The claim that the effect of alcohol upon the system is to produce such a condition of the tissues that it requires greater and greater quantities to produce intoxication is by no means substantiated, especially in cases where there are considerable periods of abstinence. Waugh¹ denies the statement that drug users increase the dose because it takes more and more to produce exhilaration. He says that all whom he has questioned have confessed that they increase the dose because they desire more of the feeling. The same was found to be true in some alcohol cases at least. Some say that less is required to intoxicate as the habit progresses. In cases where drinking is steady day after day, however, there seems to be a capacity for consuming with comparative impunity larger and larger quantities. In cases of relapse after cures by the Keeley and other methods, sudden deaths are due no doubt, to the inability of the system to consume quantities of alcohol which were readily disposed of after long practice.

The strongest evidence against the view that "alcoholized

¹Cocaine Addiction, *Jour. Inebriety*, Apr. 1898. Vol. XX, No. 2, p. 192.

protoplasm" is the physiological basis of the craving for alcohol, is furnished by abundant testimony that the young drinker is far less amenable to treatment than the old drinker, which could hardly be the case if a slow process of poisoning produced the craving. The sudden cures, especially the psychical cures, also offer evidence against this view. The widespread belief in the deep seated nature of the alcohol craving, that it is a "part of a man's body," etc., has had in the past a pernicious effect. The belief that a habit is incurable does more than anything else to compel its continuance. Cases quoted above show this, and also the effect of the opposite belief (that the habit is broken) in effecting a cure.

The facts brought forward in preceding sections sufficiently prove that the pain in the world is not sufficient to account for the prevalence of intoxication and drunkenness. There can be no doubt that pain is one of the most important causes of drunkenness—but it is not the only cause, and the great intoxication motive in its origin and development is not connected with pain at all, but rather with pleasure. The theory that alcohol craving is an "animal lust" or a physical craving is too indefinite to admit of discussion.

The theory that alcohol is used because it causes wider variations in life, which is otherwise too monotonous, expresses vaguely an important psychological factor in intoxication, as does also the view that alcohol changes the relation of common to individual sense. Beard's theory of the close connection between high mental development in a race and a love of stimulation also accords with the view upheld in this paper.

Reid's theory that the craving for alcohol is a specific craving, a by-product of mental evolution, that it exists in every one, whether he is aware of it or not, and that it is in process of gradual elimination from the race by a selection against it is out of accord with the facts. The transferableness of the alcohol habits for other habits show that it is not such a specific craving. Even though it were true that in nations which have been long accustomed to alcohol there is less craving for it than in nations in which the habit has been recently acquired, this does not prove that the relation is one of cause and effect. It is probable, as Reid says, that a process of elimination of the most unfit in regard to alcohol, as of those who are unfit in other respect, has been going on slowly. But this is inadequate to account for the differences in the drink craving of the individuals of different nations. The history of nations shows also that the elimination of the alcohol craving has not been a uniform process. As we have seen, times preceding eras of high culture have been times of gross intoxication, temperance has come with the highest culture, and then intemperance again

as the nation decayed. Lower races which have long been accustomed to native alcoholic beverages perish in the presence of the stronger drinks of civilized men, showing that their long acquaintance with alcohol has not eliminated the craving for it. It is well known that Europeans, especially Italians (who, Reid says, have not a strong craving for alcohol), on coming to America readily succumb to the drinking habits of the country.

There is nowhere in the history of drink an account of the sudden introduction of alcohol into a civilized country. In that case, we should expect if Reid's theory is correct, the most disastrous effects, for no degree of civilization would be in the least a safeguard against it in the absence of a long period in which selection had been at work to eliminate the craving. A good example of this, though not on a national scale, is to be found in the case of families which have been abstainers for a number of generations. On Reid's theory we should expect that the descendants of these would be weak in the presence of alcohol. This does not appear to be true; in fact quite the opposite conclusion is warranted.

The sudden introduction of alcohol into a nation in such a state of growth as that of our own country at the present time, if it were possible, would probably not, as Reid says, result disastrously, for the reason that selection has already produced, in connection with general advancement of civilization, those qualities of control which antagonize all forms of destructive habits.

Reid's theory is constructed out of the analogy which he draws between zymotic diseases and habits of a mental nature, assuming that the latter are as specific as the former. This is the error upon which the other errors of the theory, as well as of its practical conclusions are based. The most valuable part of the theory is the term "by-product of mental evolution," which, though in itself explaining nothing, calls attention to the relation between the alcohol craving and normal mental development. Upon that relationship the view of the present writer is based.

§ 8. SUMMARY OF FACTS AND OUTLINE OF A THEORY OF THE INTOXICATION IMPULSE.

Some of the facts concerning intoxication which must be taken into account by any theory of the intoxication impulse are the following: (1) Intoxication is one of the most important parts of the religious and social life of primitive man. The use of alcoholic beverages arose in connection with the religious social life in the effort to heighten the religious social-consciousness. Its use for these purposes among primitive peoples is widespread

and almost universal. (2) The drugs which have been widely used for intoxication purposes are capable of producing quite different effects. They may either increase or decrease the *intensity* of consciousness. (3) The state of intoxication is essentially a succession of emotional states having a distinct climax. In the pleasure stage the consciousness of self is increased, and the external world diminished in importance. (4) The historical importance of intoxication is shown by the deep impression it has made upon the literature and language. (5) The history of intoxication shows that it has been exceedingly prevalent at times of rapid development. In the individual intoxication habits are most likely to be formed during adolescence, and during this period they are more difficult to overcome than later in life. (6) The study of individual cases shows that taste is a small factor among the causes of the intoxication habit. The craving for alcohol is not a physical craving, but is essentially a craving for a mental state. The drunkard does not recognize the craving as a specific craving for alcohol, and when for a time alcohol cannot be obtained there is little left in consciousness of the craving. There is also evidence to show that the alcohol habit and the other drug habits are readily interchangeable. A man can be cured of one by substituting another. (7) The whole history of intoxication shows its close connection with the social-consciousness. The feeling is so strong that many habitual drinkers regard it as disgraceful to become intoxicated when alone. (8) A study of analogues of the intoxication state leads to the view that there has grown up in the race a strong impulse to seek intense states of consciousness, and that this impulse has been favored by natural selection for several reasons.

The results of a necessity for a strong impulse to seek intense states of consciousness and a consequent centering of selection upon this impulse may be summed up as follows:

1. An increasing instinctive tendency to seek intense states of consciousness.
2. An increasing capacity for self-control. (A capacity for intense mental activity plus an adequate control is the condition of highest efficiency.)
3. A greater capacity for pain and a tendency to revert to more primitive states of consciousness.
4. An increasing number of defective and abnormal cases.

The intoxication impulse is to be regarded as one form of expression of the general instinctive tendency¹ to seek intense

¹In regard to general instinctive tendencies the following from Groos is in point. At the moment when the intelligence reaches a point of development where it is more useful than the most perfect instinct, natural selection will prefer individuals in whom instinct appears only

states of consciousness, and not as an independent impulse which has become instinctive by reason of centuries of indulgence, nor an instinct which has grown up as a by-product of mental evolution. The prevalence of the special form of the expression of this general impulse in intoxication has probably been greatly favored by the assistance which it has given to the social consciousness.

The desire to revert to more primitive states of consciousness, accompanying a condition of high pressure, is the impulse which appears everywhere in the literature of drink as the narcotic motive. This tendency of man to look behind him has placed the golden age in the past; it has created mythic accounts of Fountains of Youth, of Paradises in remote lands, of Utopias and Nirvanas. All these are expressions of fatigue, of a longing away from a too tonic environment. This spirit is the keynote of mysticism, the constant theme of which is rest; to be relieved from weariness and pain. The cry of "back to nature," which is raised when the weight of the accumulated culture and conventionality becomes burdensome, is another expression of this impulse. Rousseau is as good an example as any one of this tendency in philosophy; in his case there is plenty of evidence to show that the psychological foundation of his hatred of society and his worship of nature was an abnormal physical condition. The same psychological foundation must be attributed to much of the *laissez-faire* ideal as it appears in education and ethics. Nietzsche¹ sees the true nature of this motive, hence his contempt for pity. "What we need," he says, "is pain, more pain." Again he speaks of the two great European narcotics, Christianity and alcohol; these he places together, doubtless because he recognizes in both the impulse to seek an artificial means of escaping pain, in both a means of compensating for or palliating the sternness of reality. "Pain spurs the nervous system on," Mosso says. It creates states of second breath. The seeking of artificial means of alleviating it whether it be by narcotics, by the over-development of the social consciousness, or by socialistic schemes is an expression of the longing backward, away from the influence of natural selection and the struggle for existence. This is an impulse common to all minds in a degree. It appears in normal relaxation, in reverie, and in sleep, all of which states considered from the standpoint of evolution are reversions. The narcotic impulse is well expressed in the hedonic narcosis, which is pessimistic, representing a desire to escape from the will to live; intoxication, on the other

in an imperfect form, manifesting itself in early youth in activity purely for exercise and practice. *The Play of Animals*, p. 44, preface.

¹ Ellis: Affirmations.

hand, is optimistic and symbolizes the will to live. The relationship between optimism and intoxication is touched upon by Parker,¹ in an article on the psychology of belief. "Excitement of any sort," he says, "seems to quicken conviction. Stimulants arouse belief. Belief is an expression of the instinctive force of life."

It was found that all stimulant-narcotics were capable of affecting the consciousness in two opposite ways. They can increase or diminish its intensity; this characteristic coincides with the facts in regard to the motives which lead to their use. In accordance with an evolutionary standpoint the drunkard is to be regarded (1) as one in whom the craving for intense states of consciousness is over-developed, or who is lacking in control; (2) as one who (usually as a result of pain) has an abnormal craving to revert to a state of consciousness which is less intense.

(It matters little, however, whether in the last mentioned case the impulse be regarded as a true instinctive tendency which has grown up in connection with other instincts which have favored mental development, or whether the painful state be regarded as simply the cause or occasion of an abnormal activity of a normal instinctive craving.)

To sum up this evolutionary theory: the intoxication impulse is not a physical craving nor a specific impulse but it is one form of expression of a general instinctive tendency, which has developed in the race as an aid to mental growth. This impulse is not merely an expression of a surplus of energy but is instinctive. In explaining the prevalence of intoxication, there must be taken into account, also, the narcotic effect of intoxicants, and also an impulse to revert to a less intense form of life.

A single general conclusion may be stated as follows: The most determining factors in the life of man are not the definite, specific instinctive impulses which appear to govern to a greater extent the actions of animals, but certain general impulses which are innate. These tendencies are exceedingly plastic, and probably those impulses which have been developed for the purpose of accelerating mental growth and those impulses which seem to determine long continued and definite lines of conduct are the most plastic of all. It is possible that too much has been made of the rigidity of habits and also of the limits of the range of the human instinctive activities in general. A practical conclusion which results from such theories as those of Reid, who maintains that the craving for alcohol is a specific craving, has been mentioned above, namely, that the only way in which

¹ *Popular Science Monthly*, Vol. LI, p. 749, 1898.

man can become safe in the presence of alcohol, is by a process of selection, which will weed out those who have the craving for it in an abnormal degree. This process can be accelerated by allowing all to have an opportunity to test their control, and by preventing those who fail from generating offspring. If alcohol is abolished from the world, the craving (increased by the removal selection) will cause a disastrous return to drinking at some future time.

Such a view receives no support from the evidence of the present study. In fact quite the opposite practical conclusion is indicated. If the craving for alcohol is one expression of a general instinctive tendency, the selection which continually favors the type of mind which craves intense consciousness also favors a general self-control, so that a process of evolution would go on in the entire absence of alcohol until such a high degree of general control was developed that alcohol, if then suddenly introduced, would have little effect except upon the minority who were constitutionally unfit in other respects, as well as in the matter of resistance to alcohol. There probably is no reason derived from an evolutionary view why alcohol should not be entirely abolished from the world, and the craving which it satisfies be turned into some more useful channel. Its social need is no longer apparent, in fact, it now on the whole favors an over-development of the social consciousness which is harmful to a great many. It is a mistake to think that free access to alcohol decreases the number of the unfit in regard to it, for the reason that in exposing all to this selection, many whole families are injured from which weakness might otherwise be eliminated in a few generations; for a slight degree of craving on the part of a parent may, if indulged, produce degeneracy in the offspring, by direct effect of the alcohol, while many others are indirectly injured. Evolution of control of all such habits as the alcohol habit would therefore go on much faster in the entire absence of alcohol as a factor in selection. The removal of painful conditions, and the utilization in useful channels (rather than the suppression) of the plastic impulse which causes intoxication are the pedagogical lines indicated by the present study.

It was stated at the outset that the interest in the present problem grew largely out of a desire to test the value of psychological methods in dealing with certain ethical problems. Any one of a large number of impulses which are important because they determine morbid conduct might have been chosen for similar study, as for example, the gambling impulse, envy and jealousy, or the sexual impulse.

It may well be maintained that a psychological standpoint is too limited, and that these suggested problems of ethics are

larger than psychology. That would readily be granted. Indeed it seems inevitable that ultimately a broad biological method must be adopted (based upon a monistic philosophy) in which the individual is the unit, and in which psychological and physiological data will be placed on equal terms and supplement or mutually explain each other. If we are willing to adopt such a monistic hypothesis, the impulses and instinct feelings, their differences from individual to individual, and their changes in the same individual are to be regarded as the correlates or reverse side of exceedingly complex anatomical, physiological, and chemical factors. To attempt at present to study ethical problems from the side of the physical sciences, is to be hopelessly lost. There remains the psychological approach, and its advantage consists in the fact that the psychical elements to be studied, the impulses, are comparatively simple, unified, or synthetic expressions of very complex physical and chemical conditions. For these reasons it is probable that for a long time to come psychological methods will be of most service in the study of ethical problems.

II.

EFFECT OF SMALL DOSES OF ALCOHOL UPON THE ABILITY TO DO MUSCULAR AND MENTAL WORK.

§ I. RÉSUMÉ OF RECENT LITERATURE.

Kräpelin's¹ studies began with one on the effect of alcohol upon reaction times. Doses of from 25 to 60 grams were used, and four subjects were tested. There was a shortening of the time under the influence of small doses of alcohol, and an increased shortening with an increase of the dose up to a certain limit. The increase began to appear during the first five minutes, and reached its maximum during the first twenty minutes. With a larger dose the reaction time was lengthened, or the period of increased speed was shortened, and there was a greater lengthening of time with an increase of the dose. In all but two cases when there was an initial shortening of the time, there occurred later a lengthening of the time beyond the normal. Dietl and von Vintschgau² used from $\frac{1}{2}$ to 1 bottle of champagne, and found that if the "quantity be not very great" the reaction time is shortened for a certain period. The quickening

¹Kräpelin: Ueber die Einwirkung einiger medicamentöser Stoffe auf die Dauer einfacher psychischer Vorgänge, *Wundt's Studien*, 1883.

Kräpelin: Ueber die Beeinflussung einfacher psychischer Vorgänge durch einige Arzneimittel, 1892.

²Dietl und von Vintschgau: Das Verhalten der physiologischen Reactionszeit unter dem Einfluss von Morphinum, Caffee und Wein, *Pflüger's Archiv*, XVI.

lasts longer when the wine is drunk slowly and in small quantities.

Exner¹ found that one bottle of Hochheimer changed the reaction time from 0.1904 sec. to 0.1997 sec., and a second bottle caused a still further slowing to 0.2884 sec., and later to 0.2969 sec.

Warren,² using varying quantities of absolute alcohol, comes to a negative result, and concludes that although the results suggest that the reaction time may be quickened after alcohol, and that the later effect is in the direction of a slowing, such a conclusion is not fairly established by his own observations, and, indeed, it is hard to make out any effect of alcohol on simple reaction times.

Several experiments have been made upon the effect of alcohol on the power to make muscular contractions. Lombard³ found that the taking of whiskey or claret was always followed by increase in the muscular power. No depressing after-effect was observed. He found, however, that the muscle when stimulated by electricity contracted with less force after alcohol had been taken, at the same time that the voluntary contractions were increased in force. His conclusion that the contractility of muscle-tissue is decreased by alcohol is confirmed by Hemmeter's⁴ experiments upon the effect of alcohol on the isolated heart.

Kräpelin's dynamometer tests show nothing conclusively. With one subject alcohol caused an increase in the muscle power, and in the other it caused a decrease. Two other experimenters have recently published the results of tests with the ergograph upon the muscular power, the studies being primarily to determine the comparative effect of alcohol upon fatigued and fresh muscles. Frey⁵ finds that the power of a fatigued muscle increased after the taking of alcohol, while in the fresh muscle there was no change. Destrée⁶ repeated Frey's experiments, alternating normal with alcohol tests, 10 grams of absolute alcohol being used. He found that in both fresh and fatigued muscle there was a rise in the curve, occurring from one to two minutes after the taking of alcohol. This increase lasted from

¹ Exner: Experimentelle Untersuchungen der einfachsten psychischen Prozesse, *Pflüger's Archiv*, VII.

² Warren: Alcohol and Reaction Time, *Journal of Physiology*, Vol. VIII, pp. 311-348 (1887).

³ Lombard: Some of the influences which affect the power of voluntary muscular contractions, *Journal of Physiology*, Vol. XIII, No. 1 and 2, 1892.

⁴ Hemmeter: Comparative effects of certain members of the ethylic alcohol series (C_4H_9O to $C_5H_{12}O$) on the isolated mammalian heart.

⁵ Reviewed in the *Correspondenz-Blatt für Schweizer Aerzte*, XXVII, No. 2, Nov. 15, 1897, p. 675.

10 to 30 minutes. Then there was a drop in the curve, and it finally sank below the normal. The larger the dose of alcohol the more rapid the onset of the depression and the longer its continuance.

Taking all the foregoing experiments into account, it seems that for those processes which are predominantly motor, the effect of moderate doses of alcohol is at first to cause an increase in the power and then a decrease,—or a quickening followed by a slowing, if the question is one of time. The experiments of Lombard, and those of the writer, presently to be described, furnish some evidence for the conclusion that, at least in the case of the subjects tried, a dose of alcohol may be made small enough to cause a stimulating effect, which is not followed by a depression, or after which the depression is very long delayed.

Processes of a mixed or predominantly sensory or associational type, are more difficult to experiment upon and the results are less definite. Aschaffenburg¹ has recently made a study of the work done by four typesetters on abstinent and alcohol days. His subjects were all beer drinkers, but abstinence was maintained for the purposes of the experiments. Doses of two hundred grams of an 18% Greek wine were used, administered after the first 15 minutes' work. Less work was done in an hour on alcohol days than on abstinent days. In all cases but one the amounts done on alcohol days fell below the estimated expectation and in each case the total amount of work done on an alcohol day was less than that done on an abstinent day. There was no qualitative change in the work. Smith,² using from 40 to 80 grams of alcohol, given in small doses throughout the day, tested the ability to add and to learn nonsense syllables. Groups of alcohol days were alternated with groups of normal days. The effect of the first day's alcohol was to paralyze the power of improvement. After some days there appeared a summation effect, and less work was done each day than on the day before. An after-effect was apparent eight days after the alcohol series ended, for, on its resumption, the work fell off much more rapidly than during the first series. Nonsense syllable learning was affected more than adding. In the latter case, less than a third as much work was done on the last alcohol day as on the first.

Kräpelin in his experiments upon mixed processes found variable results. In the adding tests, all seven subjects showed an increase at first. In learning twelve place figures a similar increase appeared in every case. In reading, the total amount

¹ Kräpelin's *Psychologische Arbeiten*.

² August Smith: *Die Alkoholfrage und ihre Bedeutung für Volkswohl und Volksgesundheit*.

done was increased by alcohol in all but two cases. In all these experiments, alcohol caused a greater irregularity and variation in the work product. Tests upon the quality and rapidity of association showed a change in the character of the reactions. There were greater irregularities in the alcohol series and more "outer" associations. Averages for a series of twelve days show that on the whole the association time was longer on the alcohol than on the normal days. Kräpelin concludes that alcohol tends to increase association time. Still his tables show that there was sometimes a shortening of the time, as an initial effect. From his whole series of experiments, he concludes that while the effect of alcohol in moderate doses upon the motor processes is to cause an initial stimulation, and then depression, and in larger doses depression from the start, the effect upon all sensory processes is depression. The variations from this law in the processes tested Kräpelin thinks may be accounted for by the presence of a motor factor in the processes.

§ 2. EXPERIMENTS OF THE WRITER.

The writer's own experiments, performed chiefly on himself and with small doses of alcohol, bear upon two points: (1) The effect of alcohol upon physical work with the ergograph; and (2) the effect upon the psychophysical processes of adding, reading, and writing.

A. *The Effect of Alcohol upon Work with the Ergograph.*

Apparatus and Methods. The ergograph used was a Salter's hand dynamometer securely fastened in a horizontal position on a table and provided with a writing point attached directly to its shaft. A record of the usual form was thus obtained upon a kymograph drum, while an endless tape, similar to that described by Lombard,¹ was also attached to sum up the contractions.

The method was the following: One hundred maximum contractions were made, at intervals of 1.6 sec., a metronome marking the time. The remainder of a ten minute period (7 m. 20 sec.), was used for rest. The round of work and rest was then immediately repeated. Six of these rounds (six hundred contractions in all) were made in an hour. The time of day for experimenting was from 8 to 9 A. M. On days when alcohol was taken the dose was 90 grams (in a few preliminary tests 60 grams and 45 grams), of a 33½% alcohol, and was taken five minutes before work began. By preliminary practice the hands and arms were hardened to the work.

¹ *Op. cit.*, p. 4.

Results. The ergographic experiments fall into three groups. (1). In the first group experiments were made upon two subjects, H and P. H worked thirteen consecutive days, two hours per day, from 8 to 9 in the morning, and from 5 to 6 in the afternoon. On the fifth, sixth, seventh and eighth days 60 grams of $33\frac{1}{3}\%$ alcohol was taken, both morning and evening. For the four alcohol days the average for a single round (100 contractions) is 100.6 cm. (mean variation, 3.0). For nine normal days, five preceding and four following the alcohol days, the average is 105.6 cm. (mean variation, 2.6). The averages for the evening work are, for the alcohol days, 104.9 cm. (m. v., 1.1) for six normal days, three preceding and three following the alcohol days, 108.7 cm. (m. v., 2.2), showing less work done in each case on the alcohol days.

The results of H's¹ work, given by rounds, follows.

Table showing average for each round for morning and afternoon work on normal and alcohol days, Subject H.

	ROUND 1.	ROUND 2.	ROUND 3.	ROUND 4.	ROUND 5.	ROUND 6.
Normal 9 days, A. M.,	107.3 (4.2)	108.5 (4.1)	106.2 (3.3)	105.1 (3.5)	102.9 (4.1)	103.6 (4.1)
Alcohol 4 days, A. M.,	104.1 (6.5)	102.3 (4.0)	100.4 (4.6)	100.2 (3.0)	98.0 (2.9)	100.9 (2.1)
Normal 7 days, P. M.,	110.8 (5.0)	108.9 (5.0)	110.5 (2.8)	109.2 (3.0)	106.2 (2.4)	106.7 (1.9)
Alcohol 4 days, P. M.,	109.0 (1.2)	108.6 (1.2)	105.9 (2.5)	103.2 (1.4)	101.6 (.9)	101.8 (2.3)

Subject P² worked 25 days between December 10, 1897, and January 8, 1898. December 11 to 20 and January 5 to 8 were normal days. On December 21, 22, 23, 24, 30, 31, and January 1, 2, 3, 4, 45 grams of $33\frac{1}{3}\%$ alcohol was taken five minutes before work began. The average for the first four alcohol days is 77.5 cm. (m. v., 3.2): for the four preceding normal days the average is 78.0 cm. (m. v., .7). The average for the alcohol days, from Dec. 30 to Jan. 4, is 101.7 cm. (m. v., 2.1), and for the eight nearest normal days 101.7 cm. (m. v., 7.1), showing that the total amount of work done was not affected by the alcohol. When, however, the averages for each period of the alcohol days are placed beside the averages for the normal days so as to show the typical fatigue curve under each condition, a result is obtained which appears also when the averages are taken separately for the two groups of alcohol days and the nearest normal days, namely, a slight but regularly increasing stimulating effect of the alcohol.

¹ H is a man of 37 in excellent health. The results are given for convenience in terms of centimeters as registered upon the tape. A centimeter equals, approximately, a pull of 100 pounds.

² Man of 27 in good general health, of nervous temperament.

(2). The second group of experiments extended from January 9 to February 25, 1898, and was made by subject P alone. The experiments were performed between 8 and 9 in the morning. Ninety grams of $33\frac{1}{3}\%$ alcohol was taken. The order of days was as follows: Jan. 9-11 and 13-14 normal; 15 and 16 alcohol; 17 and 20 normal; 21 and 22 alcohol; 24 and 26 normal; 27 and 28 alcohol; 29 and 31 normal; Feb. 1 and 3 alcohol; Feb. 4 and 5 normal; 7 and 8 alcohol; 9 and 14 normal; 16, 19 and 21 alcohol; making a total of 16 normal days and 13 alcohol days. The averages for the whole series are normal 108.6 (m. v., 4.3), alcohol 108.7 (m. v., 6.6), showing, as before, no appreciable effect of the alcohol upon the total amount of work done. When, however, the work of the ten-minute periods is not thrown together into a general average, but taken separately, the effect of the alcohol is clear in a slight increase, followed by a slight decrease of power, which happen in this case to compensate each other. The following table shows the average for the ten-minute periods separately, with the effect of the alcohol:

PERIOD.	I.	II.	III.	IV.	V.	VI.
Normal days,	107.5 (.99)	110.8 (1.25)	109.7 (1.20)	108.6 (1.13)	108.0 (.99)	106.8 (.74)
Alcohol days,	108.3 (1.49)	115.1 (1.89)	111.0 (1.65)	107.7 (1.69)	105.9 (1.73)	105.0 (1.59)
Effect of Alcohol,	+ .8	+4.3	+1.7	-.9	-2.8	-1.8

The table shows that there is a stimulating effect due to the alcohol which lasts during the first half hour, and then a depressing effect which persists until the end of the work period. Comparison of the amount of work done on alcohol days, taking the days themselves in two sections, confirms the results given in the table.

The pulse rate was taken by the subject for the first three minutes of each rest period. The average results for 26 days show a quicker pulse on the alcohol days—less than two beats in a minute, except in case of the second ten-minute period, when the difference is slightly over three. The average for the whole series of days is, for the normal days, 115.6 (m. v., 4.8), for the alcohol days 117.3 (m. v., 4.9). Dividing the whole series of days into two periods, and averaging them separately, gives similar results.

(3.) The experiments just considered show the effect during the hour immediately following the taking of the alcohol. Those of the third group were undertaken to show the effect during the second hour. They were made, however, under somewhat different conditions. The method was the same as before, except that the number of contractions was 50 instead of 100, and that

during the rest periods mental tests were made. The same amount of alcohol was used, but the first hour was filled with other tests, and the muscle tests did not begin till the second hour, *i. e.*, the alcohol was taken at 7.55 A. M., and the muscle tests were made between 9 and 10 A. M. The groups included 20 normal and 10 alcohol days, and the order was N. A. N., N. A. N., etc.; an alcohol day between two normal days. The total amount of work on the alcohol days falls short of that on the normal days, and less work was done in each of the six periods. The averages for the whole hour's work are: normal 70.2 (m. v., 3.2), alcohol 68.6 (m. v., 3.8). The averages for the first half hour are normal 73.0, alcohol 71.3, and for the second half hour normal 67.4, alcohol 66.0.

The results by periods are given in the following table.

Table showing the effect of alcohol upon muscle work during the second hour.

ROUND.	I.	II.	III.	IV.	V.	VI.
Normal 20 days,	71.0 (.73)	75.2 (.80)	72.8 (.73)	69.4 (.72)	67.3 (.68)	65.5 (.73)
Alcohol 10 days,	70.4 (.63)	73.3 (1.17)	70.4 (1.61)	67.8 (1.42)	66.0 (1.37)	64.2 (1.10)
Loss,	— .6	— 1.9	— 2.4	— 1.6	— 1.3	— 1.3

Summary of Effect of Alcohol upon Muscular Work. The effect upon subject H of 60 grams of 33⅓% alcohol, taken just before work began, was to decrease decidedly the working power.

Forty-five grams did not affect the amount of work done by subject P, but a comparison of the curves for normal and alcohol days indicates that the alcohol produced a slight, but steadily progressive stimulating effect.

Ninety grams also failed to affect the total amount of work done by P, but in this case the effect is clear in an alteration of the work curve. There is an increase in the amount of work done during the first half hour on the alcohol days, and a decrease during the second half hour.

The effect of 90 grams upon the amount of work done during the second hour after the alcohol was taken was to decrease the amount, which was less for each period during the hour.

B. *The Effect of Alcohol upon the Rapidity of Adding, Reading, and Writing.*

The experiments upon these processes covered a period of thirty-three days, being carried on simultaneously with those last described. The amount of alcohol taken was 90 grams of 33⅓%, taken at 7.55 A. M. Work was begun at 8 A. M., and

continued until 10 A. M. During the first hour there were six 10-minute periods of tests made in the following order: adding, reading, tapping, writing. The apparatus used for tapping proved unsatisfactory, and, although the tapping was continued in order not to alter the conditions for the others, it will not be considered here. The tests occupied approximately 7 minutes of each 10-minute period. The remainder of the period was given to rest. For adding, sheets containing 16 columns of figures, 25 in each column (400 in all) were used, the same sheets being used each day, but in a different order. The reading test consisted in reading audibly at a maximum rate, the figures which had just been added. For a writing test digits from one to nine were written at maximum speed, preliminary practice having been made in order to acquire a uniform movement. During the second hour the same order of tests was followed except for the insertion of the ergographic work described above.

Adding. The average adding time for the whole series is normal 162.3 sec. (m. v., 7.4 sec.), alcohol 160.9 sec. (m. v., 6.9 sec.); for the first hour, normal 163.0 sec. (m. v., 7.0 sec.), alcohol 161.2 sec. (m. v., 8.7 sec.); for the second hour, normal 161.7 sec. (m. v., 7.1 sec.), alcohol 160.7 sec. (m. v., 5.6 sec.).

The effect of the alcohol is slight, but so far as it appears is rather in the direction of a quickening of the process than the reverse.

Reading. The averages for the whole series are normal 94.2 sec. (m. v., 2.6 sec.), alcohol 94.2 sec. (m. v., 1.9 sec.); for the first hour, normal 94.0 sec. (m. v., 2.4 sec.), alcohol 93.7 sec. (m. v., 1.8 sec.); for the second hour, normal 94.5 sec. (m. v., 2.7 sec.), alcohol 94.7 sec. (m. v., 2.2 sec.).

Here, as in the case of the ergographic work, the effect is first a quickening and then a slowing (both insignificant and mutually compensating in the general average, but appearing when the course of the work is considered). By subtracting the reading time from the adding time, the time consumed by the association process in adding is obtained approximately. The results obtained in this way bring into greater relief the effect of the alcohol which appears in the results of the adding test, namely, a quickening of the process.

The averages for the whole series are normal 68.0 sec. (m. v., 5.6 sec.), alcohol 66.7 sec. (m. v., 6.5 sec.); first hour, normal 68.9 sec. (m. v., 5.6 sec.), alcohol 67.5 sec. (m. v., 8.9 sec.); second hour, normal 67.1 sec. (m. v., 5.5 sec.), alcohol 65.9 sec. (m. v., 5.5 sec.).

Writing. The average number of figures written in each period is, for the whole series, normal 225.2 (m. v., 14.2 sec), alcohol 225.8 (m. v., 15.1); for the first hour, normal 221.6 (m.

v., 14.3), alcohol 224.3 (m. v., 16.5); second hour, normal 228.9 (m. v., 15.6), alcohol 227.4 (m. v., 14.5).

The difference is again hardly perceptible, but so far as it appears, the effect of the alcohol is a quickening of the work during the first hour, followed by a slowing during the second hour. As regards the quality of the work, the results are uncertain.

In summary of all these psychophysical tests it may be said that the effects of the alcohol are slight, but that in adding, which is mainly an association process, the alcohol seems to produce in general a slight quickening which lasts nearly to the end of the second hour, and in reading and writing, which involve more muscular action, the effect resembles that found with the ergograph, namely, a period of quickening followed by a period of retardation. These results do not confirm Kräpelin's conclusion that the 'sensory' process (adding is regarded by him as a "sensory" process) is depressed by alcohol from the start, while the motor process alone is at first stimulated. In fact the opposite seems to be true. The association process is quickened while the motor processes appear to be more likely to be slowed by the alcohol. It could not be discovered in any case that the depressing effect of the alcohol persisted until the following day.

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